MARCH, 1956

American Engineer

IN THIS ISSUE . . .

The Engineering Profession in the Soviet Union

—An Exclusive Interview with—

DR. WELDON H. BRANDT,

Westinghouse Engineer-Executive Recently Returned from a Tour of the U.S.S.R.

Dr. Brandt

Professionalism in Industry: Personnel Problems—By Herbert R. Northrup, Vice President, Penn-Texas Corp.

Full Report on Recent Headquarters Building Dedication and Board Meeting

Plus: **Early Engineers' Week News • Washington Legislative News Roundup**

EUGENE B POWER
UNIVERSITY MICROFILMS
313 NORTH FIRST ST
ANN ARBOR MICH
COVP T 71555

EDWIN J. THOMAS

Portrait by Fabian Bachrach

"...added over 20,000 employees to The Payroll Savings Plan."

"The Savings Bond Program—like any other program in a corporation—will succeed *only* if it has the complete support of top management. Recently the Goodyear Tire & Rubber Company added over 20,000 employees to the Payroll Savings Plan, attaining an overall participation of over 71%. While the drive itself was successful I feel the job is only half done. Now we are installing a program to maintain this high peak of participation. Such a program will constantly keep the merits of the program before each employee, encouraging him to provide his own security through this effortless plan of saving."

EDWIN J. THOMAS, *President*
The Goodyear Tire & Rubber Company, Inc.

What is the percentage of employee participation in *your* Payroll Savings Plan? If it is less than 50%, get in touch with Savings Bond Division, U.S. Treasury Department, Washington, D. C. Your State Sales Director will be glad to help you increase your participation to 60% or higher. A phone call, telegram or letter to Savings Bond Division, U.S. Treasury Department will bring a prompt response.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

NATIONAL SOCIETY OF PROFFESSIONAL ENGINEERS

PUBLIC SERVICE ADVERTISING COUNCIL

American Engineer

MARCH
1956

Kenneth E. Trombley, Editor

Mary Margaret Milbrath, Assistant to the Editor

NSPE Publications Committee

Vincent F. Waters, P.E., Chairman
William Oliver, P.E.
Walter G. Johnson, P.E.
W. A. Toperzer, P.E.
James A. Rives, P.E.
Charles Doell, P.E.
C. S. Worley, P.E.

N.S.P.E. Officers

Allison C. Neff, P. E., Pres.
Post Office Box 170
Middletown, Ohio

R. J. Rhinehart, P. E., Vice Pres.
Arkansas Power & Light Company
Pine Bluff, Ark.

Louis F. Frazza, P. E., Vice Pres.
225 Bamford Avenue
Hawthorne, N. J.

Virgil E. Gunlock, P. E., Vice Pres.
Post Office Box 3555
Chicago 54, Ill.

Warner Howe, P. E., Vice Pres.
76 Porter Building
Memphis, Tennessee

Lindley R. Durkee, P. E., Vice Pres.
448 Federal Office Bldg.
909 First Avenue
Seattle, Wash.

Garvin H. Dyer, P. E., Vice Pres.
c/o Missouri Water Company
123 West Kansas Street
Independence, Mo.

Clarence T. Shoch, P. E., Past Pres.
901 Hamilton Street
Allentown, Pa.

Russell B. Allen, P. E., Treas.
4610 Hartwick Road
College Park, Md.

Paul H. Robbins, P. E., Ex. Dir.
1121 15th Street, N. W.
Washington 5, D. C.

"The building of a just and durable peace absolutely requires the sustained strength which flows in such a large measure from the work of engineers."

—HAROLD E. STASSEN
Special Assistant to the President
(See page 21)

BPA

Member, Business Publications Audit

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS FOUNDED 1934

• SPECIAL ARTICLES

The Engineering Profession in the Soviet Union. An American Engineer Interview with Dr. Weldon H. Brandt 9

Professionalism in Industry: Personnel Problems. By Herbert R. Northrup, Vice President, Penn-Texas Corporation 16

Full Report of Recent Board Meeting in Washington 21

• REGULAR FEATURES

Letters 4
Professional News Briefs 6
From Washington 19
NSPE Believes 29
Professional Postscripts 30
With Our Members 38
Strictly Business 46

New Processes 37
Professional Directory 40, 41, 42, 43, 44
Classified 45
New Literature 48
Advertisers' Index 49
What's New—New Products of Interest 50

ADVERTISING INFORMATION:

R. A. Oliver, Advertising Director
American Engineer, 2029 K St., N.W., Washington 6, D. C.
Telephone MEtropolitan 8-6112

NEW YORK:
Austin LeStrange Co., Inc.
420 Lexington Avenue
New York 17, N. Y.
MUrray Hill 5-3277

CHICAGO:
LeStrange Co., Inc.
185 North Wabash Ave.
Chicago 1, Illinois
DEarborn 2-0248

LOS ANGELES:
J. W. Conrow & Co.
1175 Woodbury Rd.
Pasadena, Calif.
SYcamore 7-5365

The American Engineer is published monthly by the National Society of Professional Engineers, 2029 K St., N.W., Washington 6, D. C. Entered as Second Class Matter at the Post Office, Washington, D. C., under act of March 3, 1879. Copyright, 1956, by the National Society of Professional Engineers. Not responsible for opinions expressed in signed articles. Subcription Rates: $2 per year in advance to members of NSPE and its Affiliated Societies: $3 per year in advance to non-members in U. S. A. and its possessions, Canada and Mexico. Foreign, $4 per year. Single copy, 35c. Vol. 26, No. 3.

True engineering creativeness brings you up to $15,000 in this position

AIRBORNE FIRE CONTROL ENGINEER—

must be a pulse-circuit specialist with range tracker, synchronizer, indicator or circuitry application experience.

•

Take a vital part with an electronics pioneer in a project that has already attracted top engineering minds.

•

***To arrange confidential interview, send resume to Box 2G2, AMERICAN ENGINEER**

•

Letters to the Editor

More On Dow . . .

Dear Editor:

I was very much impressed with the article titled "Professionalism in Industry: The Dow Story" by H. P. Cooper, P.E., in the December, 1955 issue of the AMERICAN ENGINEER. I would like to obtain 375 copies of this article for distribution to our members. . . .

JOHN W. TAYLOR, P.E.,
President,
Fort Wayne Association of
General Electric Engineers,
Fort Wayne, Ind.

P. Eng.? . . .

Dear Editor:

Objection has been raised to the use of the initials P. E. to designate Professional Engineer. It seems that P. E. is better known in ecclesiastical circles and means either Protestant Episcopal or Presiding Elder according to context.

I notice on the cover of the current (January) issue of *Engineering Digest* the abbreviation P. Eng. is used under a picture of a C. R. Young, P. Eng., who is the subject of a feature article.

Perhaps it would be well to consider a general adoption of P. Eng. to replace P. E. when referring to a Professional Engineer. This form is roughly parallel to the German Dipl. Eng. used by graduate (diploma) engineers.

FRANK G. NORRIS, P.E., President
Jefferson County SPE,
Ohio SPE,
Steubenville, O.

Mr. Friel On Ethics . . .

Dear Editor:

I have read with pleasure your article on Ethical Problems and consulting engineering in the December, 1955 issue of the AMERICAN ENGINEER.

It was very easy to read and was more like listening to a well prepared and effectively delivered talk than to reading an article.

What particularly prompts me to write this letter is that (Mr. Friel) writes in a man-to-man fashion on the very pressing and practical aspects of ethical problems.

I think that anyone reading the article can have no doubt as to what is the proper thing to do. The avoidance of high sounding phrases which can very often be subject to two or three interpretations are conspicuous by their absence.

My congratulations on a timely message delivered effectively and in a worthwhile fashion.

G. G. GREULICH, P.E.,
Pittsburgh, Pa.

Amend Social Security? . . .

Dear Editor:

There is an admitted shortage of engineers. A large reservoir of engineering manpower is available and can be quickly tapped by amending the social security laws to permit retired engineers to draw their social security benefits regardless of their earnings.

As it works now, a retired engineer who draws benefits of $147.30 monthly for himself and his wife can earn up to $1,200.00 per annum without loss of social security benefits, making his income from these sources $2,733.60 yearly, less his income tax on the $1,200.00.

If his earnings are $1,520.00, for instance, his income falls to $2,555.60, less his income tax on the $1,520.00. This would make the net at the most $2,250.60, if his income tax was at the minimum 20 per cent level.

At a tax bracket of 20 per cent, if he earns more than $1,200.00 he must earn $3,416.00 to net what he can get by earning not more than $1,200.00. In other words, his earnings of $3,416 — $1,200 = $2,216.00 represent work that he did for which he received nothing net! This is $2,216 worth of engineering work which is utterly wasted!

Many retired engineers would like to do some professional work, but can't see any incentive in working in a situation where the more they work the less they get! Until this situation is changed, the ballyhoo about a shortage of engineers is ludicrous!

F. S. FRAMBACH, P.E.,
Westfield, N. J.

Spencer Article . . .

Dear Editor:

Mr. K. A. Spencer makes what in my opinion are excellent points in his article on top management (AE, February, 1956), when he deplores the feeling that formal education is other than a springboard to a lifetime of intellectual and personal growth and cites need on the part of engineer-executives for an evolving ability to sift facts in relation to context, and to develop an appreciation for and understanding of other human beings.

However his (probably unguarded) statement that ". . . from our earth's natural resources we create materials that Mother Nature in all her knowledge would never have dreamed possible", would indicate either an atheistic orientation on his part, or a completely unjustified exaggeration of the creative ability of the engineer in comparison with the Creator of the natural resources to which he refers. The former would seem understandable, the latter unwarranted.

RICHARD R. MAYER, P.E.,
Akron, O.

► **We think that Reader Mayer reads much more into Author Spencer's colorful passage than is intended.—*Editor.***

SPEED UP YOUR READING!

CLEAR YOUR DESK IN ONE-HALF THE TIME!

Executives and professional men in all fields are enjoying the miracle of improved reading. Paced with the AVR RATEOMETER, America's leading electric reading accelerator, your reading speed and comprehension doubles within a few weeks, making for greater efficiency and free time for other duties. Your investment will be repaid many times. Send today for your RATEOMETER and the Do-It-Yourself Manual. Satisfaction guaranteed. Only $35.

AUDIO VISUAL RESEARCH

531 S. Plymouth Ct., Dept. AE63, Chicago 5

Factual Reports On Science Available

The National Science Foundation has announced the publication of two important new fact reports—*Scientific Personnel Resources* and *Federal Funds for Science.*

The booklet on personnel resources is a summary of data on the supply, utilization, and training of scientists and engineers. It shows that in 1954 there were approximately 200,000 scientists and 650,000 engineers in the United States, and breaks down these figures to indicate distribution by field, age, and level of education. Another section deals with the number of college graduates qualifying to teach high-school science and mathematics courses.

The publication on Federal funds is the fourth report of its kind issued by the NSF designed to provide uniform and accurate data on funds made available by agencies of the Federal Government in support of scientific research and development. It covers the fiscal years 1954, 1955, and 1956 —the last two being estimated.

Copies of the two publications are available from the Superintendent of Documents, Washington 25, D. C., at 50 cents for *Scientific Personnel Resources* and 30 cents for *Federal Funds for Science.*

Funds Contributed to NSPE Library Project

It has recently been announced at NSPE's Washington headquarters office that the members of the National Society of Rural Electrification Administration Consulting Engineers, in disbanding their organization, voted to contribute the balance in their treasury to the work of NSPE.

In accepting the contribution, NSPE Executive Director Paul H. Robbins extended the Society's official thanks to B. O. Vannort, treasurer of the disbanded consulting group. He noted that certain funds had been earmarked to furnish and equip the library of the new NSPE headquarters building, now nearing completion, with the expectation that in time the library will contain all available literature pertinent to the professional development of engineering and will thus become a source of reference in the Nation's Capital in all nontechnical matters relating to the profession.

With the approval, therefore, of the National Society of R.E.A. Consulting Engineers, Mr. Robbins said that their contribution would be added to these funds.

"I chose Stromberg-Carlson for a new way of life... maybe you should, too"

Stromberg-Carlson offered me and my family so much more than a good salary, plus bonus and a flock of fringe benefits, that I couldn't say anything but "*When do I start?*"

There's the Company itself—sixteen times bigger today than in 1940—and now a division of the headline-making General Dynamics Corporation. One look at its Research Lab alone convinced me that here is probably the "hottest" electronics industry in America today.

There's Rochester, and its surroundings. Right in the heart of the Finger Lakes; only four hours from the Adirondacks. Home of the Eastman School of Music and Eastman Theatre; of world-famous parks; of no less than thirteen golf courses; of schools and shopping centers unrivalled in the East; of scientific industries whose engineers turn up as your next-door neighbors.

Above all there's *opportunity.* As the chap who hired me put it, "This is the spot for men who are either stymied in a little company, or buried in a giant." More than twenty fields of employment are open—as shown by the list to the right.

I started with a detailed letter of inquiry to Howard L. Foote, at the address below. Why don't you do the same?

- Audio Amplifiers
- Auto Radio
- Automation
- Carrier, Wire-Line
- Countermeasures
- Data Processing
- Digital Techniques
- Electro-mechanical Design
- Electronic Carillons
- Electronic Switching
- Infrared
- Intercom Systems
- Laboratory and Test Engineering
- Loudspeaker
- Magnetic Tape Recorders
- Microwave, communication
- Navigational Systems
- Radar
- Telephone Switching Technique
- Transistor Engineering
- Voice communication
- Writers—Bid Proposal
- Writers—Technical

P.S. Look us up at the March I.R.E. show in New York City

STROMBERG-CARLSON COMPANY

A DIVISION OF GENERAL DYNAMICS CORPORATION

106 Carlson Road, Rochester 3, N. Y.

PROFESSIONAL NEWS IN CAPSULE FORM

A Roundup of Late Events for Professional Engineers

M. S. Coover Nominated For AIEE Presidency

Mervin S. Coover, head of the Electrical Engineering Department of Iowa State University in Ames, has been nominated for the 1956-57 presidency of the American Institute of Electrical Engineers. Professor Coover, who is also a member of NSPE, is a 1914 graduate of Rensselaer Polytechnic Institute and has worked in the electrical utility industry as well as in the educational field.

AIEE vice presidental nominees are: Donald E. Garr, assistant division engineer, General Engineering Laboratory, General Electric Company, Schenectady, N. Y.; Leland F. Stone, Apparatus Sales Office, General Electric Company, Newark, N. J.; James H. Foote, president, Commonwealth Services, Inc., Jackson, Mich; Norman F. Rode, professor, Texas Agricultural & Mechanical College, College Station, Tex.; Mansfield M. Ewell, manager, Engineering & Service Department, Westinghouse Electric Corporation, Portland, Ore.; and Henry H. Kerr, vice president for operations, Toledo Edison Company, Toledo, O. Mr. Garr, Mr. Foote, and Mr. Kerr are also members of NSPE.

Another NSPE member—L. M. Robertson of Denver—is among the nominees for directors of the AIEE. Others are: William R. Brownlee of Birmingham, Ala., Alva A. Johnson of Pittsburgh, and Walter J. Barrett of Newark.

Balloting will be by mail, and results will be announced at the Summer and Pacific General Meeting of the Institute in San Francisco on June 25.

Why Jim Davis Picked RED GIANT HAND LIFT TRUCKS
BOY-THESE RED GIANTS SURE HANDLE WELL!
I'LL SAY! AND THESE TIMKEN ROLLER BEARINGS ARE SEALED AND LUBRICATED FOR LIFE! AND THE HANDLE CAN'T KICK WHEN LIFTING OR LOWERING LOAD!
AND LOOK AT THIS RELEASE CHECK-IT'S A REAL SHOCK ABSORBER TO PROTECT EVEN THE MOST FRAGILE CARGO! I CHECKED THEM ALL, AND RED GIANT HAS THEM ALL BEATEN!
WRITE IN FOR OUR FREE COMPLETE TRUCK INDEX OF RED GIANT MODELS IN OVER 600 COMBINATIONS OF SIZES AND CAPACITIES!
REVOLVATOR CO.
8782 TONNELE AVE., NORTH BERGEN, N. J.

Lichtenberg Is Acclaimed For Civil Defense Work

The Indiana Civil Defense Advisory Council to the Governor has recently passed a resolution commending Colonel Chester Lichtenberg, a well-known member of the Indiana SPE and NSPE, for his eight years of service as civil defense director for Fort Wayne and for Allen County.

The CD program initiated by Colonel Lichtenberg, who has resigned from its directorship on the advice of his physician, has served as a model for the civil defense planning of many other cities and counties.

In its resolution, the Council said, "There are too few others in the Nation who have shown comparable vision and executive capacity for establishment of a service of such vital importance to the future of the Nation."

"I take it you've been fired."

New Prexy for EJC

Dr. Thomas H. Chilton, technical advisor to the Engineering Department, E. I. du Pont de Nemours & Company, is the new president of the Engineers Joint Council.

Dr. Chilton, who assumed his presidential duties on January 27, is a former vice president of the Council, former chairman of its Manpower Commission, and also a past president of the American Institute of Chemical Engineers.

Industrial Research To Be Conference Theme

Industrial research—its motives, its management, and its results—is to be the subject under study at the first annual National Industrial Research Conference, scheduled for the Sherman Hotel in Chicago on April 18 and 19.

Sponsored by the Armour Research Foundation of the Illinois Institute of Technology, the Conference is being organized to provide a forum where common problems of industrial research can be discussed at the management level. "Research for Profit" has been selected as the theme of the meeting.

Further information is available from Joseph J. Kowal, Conference Secretary, Armour Research Foundation, Illinois Institute of Technology, 10 W. 35th Street, Chicago 16, Illinois.

Stanton Walker Receives Research Award

Stanton Walker, a member of the District of Columbia Society of Professional Engineers and NSPE, was one of the three highway engineers who received the Roy W. Crum Award for outstanding research achievement during the recent meeting of the Highway Research Board in Washington. Mr. Walker, who lives in Sligo Park Hills, Maryland, is director of engineering of the National Sand and Gravel Association.

The other engineers receiving the award were Earl F. Kelley of Chevy Chase, Maryland, employed by the U. S. Bureau of Public Roads, and Tilton E. Shelburne of the Virginia Department of Highways.

ARBA Announces Officers

The American Road Builders' Association has announced the names of its new officers as follows: President—John N. Robertson, director of highways, District of Columbia; Vice President, Northeastern District—Charles M. Noble, chief engineer, New Jersey Turnpike Authority; Vice President, Southern District—Charles W. Smith, president, Smith Engineering and Construction Company; Vice President, Central District—Julien R. Steelman, president, Koehring Company, Milwaukee, Wisconsin; Vice President, Western District—W. A. Bugge, director of highways, Department of Highways, Olympia, Washington; and Treasurer—Jennings Randolph, assistant to the president, Capital Airlines. Mr. Noble and Mr. Bugge are both members of NSPE.

Other NSPE members included among the ARBA directors are: Ben H. Petty, professor of highway engineering, Purdue University, Lafayette, Indiana; George M. Foster, chief deputy commissioner, Michigan State Highway Department, Lansing; W. L. Chilcote, deputy highway engineer, Department of Public Works, Baltimore, Maryland; and Armand E. Keeley, president, Prismo Safety Corporation, Huntingdon, Pennsylvania.

Corrosion Engineers Honor Professor

Professor Mars G. Fontana of Ohio State University, Columbus, has been selected as the 1956 recipient of the Speller Award of the National Association of Corrosion Engineers. Dr. Fontana is chairman of the Department of Metallurgical Engineering at the University.

The award will be presented to him during the Association's national meeting in New York City, March 12-16.

General Prentiss To Retire

Major General Louis W. Prentiss, commanding general of the Engineer Center, Fort Belvoir, Virginia, will retire from the Army on his own application on April 30 upon completion of thirty-five years of service, according to a Department of the Army announcement.

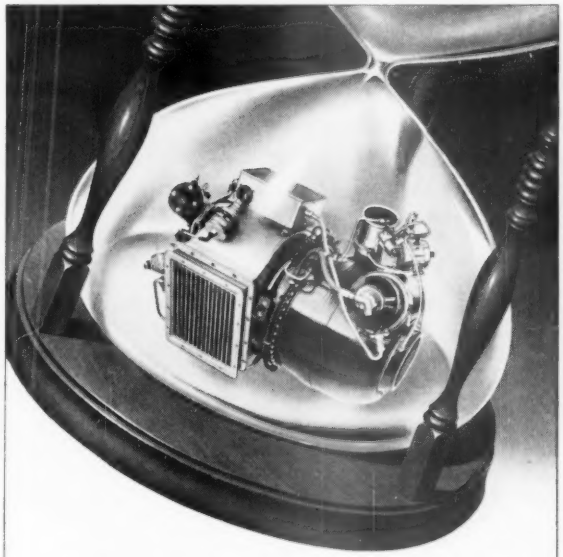
In commenting upon General Prentiss' approaching retirement, Chief of Engineers Lieutenant General S. D. Sturgis, Jr., said, "It is a severe blow to me to have to part with such a fine, seasoned, experienced officer as General Prentiss. I have agreed to his retirement reluctantly. . . . Considering the loyal and highly competent character of General Prentiss' outstanding record, his departure from our ranks adds very measurably to our loss in experienced engineers and leaders."

To the engineer with a bent for research . . .

AiResearch is looking for your kind of engineer.

We need you to help us cross new frontiers in modern engineering. Small turbomachinery is only one aspect of our pioneering activities. These extend to leadership in aircraft pressurization and air-conditioning systems, and pneumatic, electronic and heat transfer systems and components.

Positions are now open for mechanical engineers . . . electrical engineers . . . physicists . . . specialists in engineering mechanics . . . specialists in aerodynamics . . . electronics engineers . . . aeronautical engineers.



TEST OF TIME *passed by small gas turbines at AiResearch, with proved performance in the field. AiResearch has developed and produced more small gas turbines than any other company in the world.*

Write to Mr. Wayne Clifford, AiResearch Manufacturing Company, 9851 S. Sepulveda Blvd., Los Angeles 45, California. Indicate your preference as to location between Los Angeles and Phoenix.

THE GARRETT CORPORATION

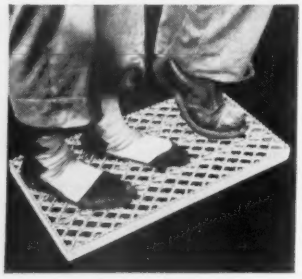
AiResearch Manufacturing Divisions

Los Angeles 45, California • Phoenix, Arizona

Designers and manufacturers of aircraft components: REFRIGERATION SYSTEMS • PNEUMATIC VALVES AND CONTROLS • TEMPERATURE CONTROLS • CABIN AIR COMPRESSORS • TURBINE MOTORS • GAS TURBINE ENGINES • CABIN PRESSURE CONTROLS • HEAT TRANSFER EQUIPMENT • ELECTRO-MECHANICAL EQUIPMENT • ELECTRONIC COMPUTERS AND CONTROLS

WALK IN

Complete Safety
Complete Comfort



with

BUSTIN

FIRM-GRIP GRATING

Here's the safety grating that eliminates falls, stumbling or slipping . . . yet is comfortable to walk on even in stocking feet. If your plant has problems due to grease, oil, wax, ice-coatings, etc., investigate this scientifically engineered safety grating. It works where others fail.

Write for Complete Catalog

BUSTIN STEEL PRODUCTS, INC.

DOVER, NEW JERSEY DOVER 6-8800

Educational Reserve Proposed by Sarnoff

The creation of a "National Educational Reserve" as an "interim program" to help solve the problem of the shortage of qualified science and math teachers in the Nation's schools has recently been suggested by Brigadier General David Sarnoff, chairman of the board of the Radio Corporation of America.

Speaking from Washington, D. C., on a nation-wide radio hookup as he received the 1955 James Forrestal Memorial Award from the National Security Industrial Association, General Sarnoff proposed that industry temporarily release from its ranks each year at full pay "a reasonable number of men and women" qualified to teach math, physics, engineering, and related subjects.

"The number of teachers recruited from any single organization would be too small to entail hardship for any one," General Sarnoff said, "but the total number comprising the corps could be drawn from such an extensive list of organizations that it would be large enough to give new impetus to teaching of the sciences in our school system. This would be especially true at the high school level which is our present major bottleneck."

Dean Dougherty Honored By Quarterback Club

The Knoxville, Tennessee, Quarterback Club recently honored N. W. Dougherty, dean of engineering at the University of Tennessee and a former NSPE vice president, by presenting him with a gift during its "Honor Day" luncheon.

Dean Dougherty, who is also serving as chairman of the University of Tennessee Athletic Council, will step down from this post when he retires at the age of seventy next September.

IBM Sponsors Post-Doctoral Study

International Business Machines Corporation has announced a plan to award industrial research fellowships to enable recipients to continue their academic research programs beyond the doctoral level. The grants will be made annually by a special awards committee headed by Dr. Arthur L. Samuel, research advisor at IBM, and assisted by an advisory panel of scientists and educators.

Fellows will be provided with working space at the company's Poughkeepsie, New York, laboratory, where they will be permitted to attend internal seminars and meetings and share in the use of all facilities, including the IBM 704 Electronic Data Processing Machine. They will receive financial support, individually determined, and will be provided with the full-time assistance of one or more technicians as required by their programs.

Virginia Tech Conference Planned

"Engineering, the Summation of the Sciences" is the theme chosen for the Seventh Annual Engineering Conference to be held on the campus of the Virginia Polytechnic Institute, Blacksburg, April 26-28.

The Conference is sponsored by the Association for the Advancement of Engineering, a student organization, in cooperation with the dean and faculty of the School of Engineering and Architecture.

Dr. L. K. Sillcox, a past president of the American Society of Mechanical Engineers and honorary vice chairman of the board, The New York Air Brake Company, will deliver the convocation address, the highlight of the meeting. In addition, more than thirty technical and professional men from various leading industries are scheduled to participate in symposia developed for each curriculum in the School of Engineering and Architecture.

Armco Steel Announces Scholarship Program

The Armco Steel Corporation of Middletown, Ohio, has announced the inauguration of a new scholarship program to encourage high school seniors to study engineering or the physical sciences when they go on to college.

Sponsored by the Armco Foundation, the program will provide for sixteen scholarships to be awarded annually to seniors chosen from high schools in communities where Armco plants are located. They will not, however, be restricted to the children of Armco workers.

The scholarships will provide $650 for each year for four years, and winners will be free to attend any accredited college or university in the United States.

Utilities Urged To Make Jobs More Attractive

Professor J. S. Johnson, head of the School of Electrical Engineering, Purdue University, has warned the electric utility industry that unless it devises better means of attracting graduating student engineers, it will soon find that it is getting only the "dregs"—men who couldn't locate jobs elsewhere.

"The electric utilities are lagging far behind in attracting the services of enough good engineers," Professor Johnson charged. They are getting a few good men, he said, but at present "except for foreign students, only a small minority of graduating electrical engineers are interested in power."

To remedy the situation, he recommended that the industry present its story more colorfully to engineering students; upgrade wages for utility engineers; and provide more challenging problems for the young engineer.

American Engineer

The Magazine of the Registered Professional Engineer

VOLUME TWENTY-SIX NUMBER THREE

From First Hand Observation . . .

The Engineering Profession in the Soviet Union

An American Engineer Interview With

Dr. Weldon H. Brandt

Engineering Manager, Director Systems Department, Westinghouse Electric Corporation, Pittsburgh, Pa.

Q: **Dr. Brandt, we realize that your recent visit to the Soviet Union was primarily motivated by technical considerations—specifically, a study of automation in Russia. However, since such personal observation of the technology of a country also brings an association with the men behind that technology, we are sure that you have brought back with you a great many illuminating impressions about the professional status of engineering in the U.S.S.R. By way of general background, may we begin by asking you if Soviet industry conforms to the concept of a "classless society" in its over-all organization?**

A: By no means. Soviet industry certainly is not a "classless society." The prestige factor is a very big thing, particularly where the managers are concerned.

Left: Shown is a tractor made at a Stalingrad tractor plant. The man in the fur cap is Mr. Alayev, assistant director of the plant. Mr. N. L. Bean of the Ford Motor Company, and one of Dr. Brandt's engineer companions on the trip, holds a book in his hand. Dr. A. C. Hall of the Bendix firm, the third American engineer on the tour, may be seen behind Mr. Bean and slightly to the right. Right: A view of the Zim Automobile Plant body line located at Gorki. Dr. Brandt says that most engineers are considered a part of management.

Offices are cramped... draftsmen work standing.

And I am sure that there is a much greater difference between the standard of living of the ordinary workers and that of the managers in the Soviet Union than there is here in the United States. In making this comparison, too, I think I should point out the extreme difference in standards of value between our economies. For instance, it may be a much bigger thing as far as prestige goes in Russia to be able to have oranges for breakfast than driving a high-priced car versus driving a low-priced car in America where both the boss and the worker can have the oranges if they want them.

Q: **Did the engineers you met in the various Soviet factories seem to be on the "management," or "oranges-for-breakfast" side of the fence?**

A: The engineers we met were on the management side. In fact, nearly all of them actually were managers.

Q: **Did they seem then to have independence of judgment and decision?**

A: They had some independence of judgment and decision as long as they operated within the framework of the preconceived plan of what their contribution to the Soviet industrial pattern ought to be.

Q: **Is this an efficient method of operation?**

A: There are no doubt some elements of efficiency in it. But I want to make it clear that I have utterly no sympathy for the Soviet system as such in any phase whatsoever. As an over-all thing it is just not right.

Q: **Dr. Brandt, could you form any conclusions about the numbers of engineers employed in proportion to the other workers in the factories you visited?**

A: The number of engineers is quite high. For instance, the Ordzhonikidze Machine Tool Plant, which we visited in Moscow, has 3500 employees, including 450 engineering employees of whom 300 have technical degrees while the others qualify as technicians.

This ratio is particularly high in view of the fact that no research and little of the sort of engineering work which we would class as development is done within the factories. Such work is carried out instead in the appropriate institutes. Research work is done in the research institutes which are connected with the Soviet Academy of Sciences. Development work, as we understand it, is done in other institutes reporting to the appropriate Government Ministry.

Q: **Then how are the results of the research done in the institutes channeled to the factories for practical translation into products?**

A: The results are channeled in two ways. First, in many cases, the development institutes apply the research know-how to the design of the first models. Then after the first model has been built and proven, it is sent to the factory for production. Secondly, certain straight information is also channeled through the development institutes. For example, ENIMS (which is the abbreviation by which the institute which translates to "Experimental Scientific Research Institute for Metal Cutting Machine Tools" is known)—ENIMS follows technical literature in Russia and abroad and disseminates it to the factories.

Q: **In this channeling, Dr. Brandt, is there ever any confusion as to who will handle which newly-developed product?**

A: I am glad you asked that, because it seems to me that some very serious problems must arise when a product cuts across the lines of responsibility of two Ministries. For example, I inquired at the Gorki Automobile Plant as to how they would assign work on a new generator. And I was told that it would be designed in an institute coming under the Electrical Equipment Ministry and then built by a factory

Left: A view of a subway station at Leningrad. This is very new. There are eight stations, each of which has its own style of elaborate architecture. Each station utilizes a different marble. These subways are very deep and the electric stairways leading to them are alleged to be the longest in the world. In Dr. Brandt's estimation, the length exceeds 250 feet. Right: The Pobyetta assembly line. Motion is counterclockwise as viewed in picture. This car has 52 HP and sells for 20,000 rubles or about $5,000. It will soon be replaced by the new Volga.

An engineer can make 3,000 rubles per month.

coming under the same ministry, but the specifications would be written by the Gorki Plant, which comes under an automotive ministry. This means that in case of an argument or a difference of opinion, you must go on to a higher level than even the Ministry in Moscow to get a referee for the problem. It certainly is an example of what I would call a "monstrous bureaucracy."

Q: **Well, coming back now to the number of workers in the factories, how does the ratio of engineers to regular workers compare with the situation in the United States?**

A: The ratio is obviously higher in Russia than in this country. However, the word *engineer* seems to have a little different significance in the U.S.S.R. than it does here. The regular engineer's efforts in Russia are not channeled so much toward design as they are in the United States, but are directed more frequently toward production management. As a matter of fact, engineers and foremen are often mentioned together as a class. At the Stalingrad Tractor Factory, for one example, there was the director at the top, then the chief engineer, and under him came both the shop and the engineering department.

Q: **We are interested in the working conditions which were provided for the Soviet engineers. Could you tell us a little about them?**

A: Well, I cannot answer this as definitely as I would like to; but I would say that working conditions in industry and in many of the institutes are not as good as our own. Industrial "housekeeping" is poor. Lighting is not as good in the offices, which are also rather cramped. Desks are small, and many draftsmen work standing. Also, even the better laboratories seem crowded. And I think it was interesting to note that people *inside* the factories worked in hats and coats, well bundled up against the cold.

Q: **Did the Russian engineers seem to be supported in their work by technicians, clerical aides, and so on? Or do they have to do all of the routine, as well as the specialized work, themselves?**

A: I would say that they seem to be fairly well supported by technicians and so on. We can improve our own situation in this regard, of course; but I do not believe that the Russians are ahead of us on it.

Q: **What about salaries? Is there any comparison between the salaries being paid to Soviet engineers and the premium offers being made to engineers in the United States today?**

A: The average Russian engineer in industry makes perhaps 1400 rubles per month. If he works in a development institute, the average goes up somewhat—perhaps to 1600 rubles. In a research institute he will get 1300 rubles per month. Then superimposed on this there are bonuses, prizes, and royalties on patents so that the outstanding performer can do considerably better than the averages I have quoted. A man working strictly as an engineer in industry can reach a peak of somewhere around 2500 or 3000 rubles per month.

The exchange rate is four rubles per dollar, and this would not be bad, speaking in terms of salary comparisons, *if* that also represented equivalent purchasing power. The purchasing power of the ruble, however, is more like ten or twelve rubles to the dollar, the "black market" rate—although, of course, there is not supposed to be any such thing.

The Russian engineer does *not* have a standard of living anywhere nearly equivalent to that of the engineer in the United States, though he does far better than his own compatriots of the ordinary working class. I would say there is some comparison between the two countries as to cost and availability of bare essentials, such as bread, for instance. But as soon

Left: An interior view of a subway car in Leningrad. Right: A factory scene showing materials handling between forming operations. Part shown came from a press at left and will probably be delivered to the press shown at right. The plant was at Gorki.

Engineers collect royalties on their patents.

as you get into even such items as shoes the cost and quality gap widens immensely.

Q: **We understand that there are labor unions organized within the Soviet Union—although they never strike. Just what are the functions of these unions?**

A: The functions of the unions seem to be the operation of certain benefit programs, rest camps, and children's camps. They are in theory also responsible for safety standards in the factories, but these standards are certainly not equivalent to those in America.

Q: **Are the unions plant-wide or country-wide?**

A: I am not sure. However, in speaking of the unions, the directors of the various factories said nothing to indicate that they had to deal with them as country-wide.

Q: **Do engineers belong to them?**

A: I do not know whether or not they belong. The subject was never mentioned. There was never any mention of engineers as an organized group.

Q: **Do the Russians seem concerned at all in regard to what we call the "professional status" of engineering? Do you know whether they have any professional societies or professional journals like the *American Engineer?***

A: This question also did not come up. It is a little difficult to see how it would, and I would be very surprised to find a professional organization in Russia devoted to developing the professional status of engineers. I doubt that there would be room for anything like this in the Soviet system. The Soviet engineers do have their prestige—which perhaps is their "professional status"—but they have it only because the Government feels they should have it. It is a matter of Government policy and can be turned on and off like a faucet.

Q: **Did you learn whether the Soviet Union has any laws or regulations concerning the practice of engineering similar to the registration laws of the various states in this country? Is there any such thing as professional registration in Russia?**

A: We did not hear of any registration laws or of professional registration in Russia. I think there is a drastic weeding out process in the educational system itself—much more so than here. Another interesting thing is that if a man is aiming for an engineering degree, he goes to school full time. There is no other way to qualify.

Q: **What about the technical schools that are connected with the factories then?**

A: These train technicians. They do not give degrees.

Q: **This may be a superfluous and self-evident question in view of the political philosophy of the country—but did you note any evidence of any independent practice of engineering in Russia? Are there any organizations similar to our consulting firms?**

A: We certainly saw no evidence of any independent practice of engineering or any organizations that could be termed consulting firms. I am quite sure they need all the engineers they have in industry and in the research institutes. They also need them—and have them—in the Government itself to assist in what we might call "management problems" in the administration of their various technological programs.

You see, everything is really a Government-owned monopoly. And I would say that about the only way a man might be in business for himself would be

Left: A view in an experimental machine tool plant named the Experimental Scientific Research Institute for Metal Cutting Machine Tools. Experimental plants of this sort have higher standards of housekeeping, lighting and safety than production plants visited. Right: A lathe assembly line at the Red Proletariat Machine Tool Plant, Moscow.

On this line 6-position turret lathes were being assembled with capacity stated at 54 lathes per day. Machine tools are being built at a very substantial rate but in plants visited there were relatively few modern machine tools in actual use.

to have something like, say, a produce stand, where he would employ no one but himself.

Q: **Dr. Brandt, in this Government-operated scheme is there any choice about the type of engineering job a man may take or the particular industry for which he wishes to work?**

A: I do not really know how much choice they have. Many articles have been written in this country indicating that they do not have much choice. I would say from my own observation that their engineers are very specialized, and this, of course, would limit the choice that a man would have. But I would not be surprised to find that the really outstanding men have some choice as to where they go initially at least.

Q: **We know that you have remarked since your return on the number of women employed in engineering in the factories you visited. Were these women working in the capacity of technicians, or as full-fledged engineers?**

A: Actually, the comments in the report I prepared on my return were on the number of women employed in factories in general, rather than the number in engineering. They do employ women more than men in almost every civilian field you can think of. In the engineering laboratories which we visited, I am sure that some of the women were technicians while others were full engineers. Those we saw at the Institute of Standards, Measures and Measuring Instruments, which corresponds roughly to our Bureau of Standards, definitely seemed to be full-fledged engineers. And I believe that they do have more women engineers in Russia than we have in this country.

Q: **Are the engineers in Russia encouraged to undertake any advanced study?**

A: I do not think that *encouraged* is quite the proper word. They either *qualify* or they do not qualify for advanced study, depending on the record they have made in their undergraduate work. If they qualify, they get a very nice stipend for doing this graduate work—about 780 rubles per month.

Q: **In doing this advanced work, are they ever advised to familiarize themselves with any subjects other than the strictly technical?**

A: I don't believe that they are encouraged to study anything that is not strictly technical. Whatever general subjects they study are carried during the first several years of undergraduate work. From that time on they specialize.

Q: **What about patents? You mentioned "patent royalties" previously in talking about salaries, Dr. Brandt. Under this strict organization for the development of products do they have a patent system?**

A: Yes; they do. Developments are Government-owned; but any citizen may apply for a patent, and this gives him the right to collect a royalty on the profit—and may I stress this capitalistic word *profit*—that results from his invention.

Q: **Does it make any difference as to where and how the work on the invention was done? Does this affect the patent rights?**

A: As I understand it—no. The patent rights apply whether the person works in an institute, development laboratory, or on his own.

Q: **Now how do you feel about the specific products you had the opportunity to inspect? Were they up to the standards of their counterparts in the United States?**

A: As to quality, it seems to me that consumer goods

Left: An injection die cast machine at the Experimental Scientific Research Institute for Metal Cutting Machine Tools. Right: Refreshments are served at the Ordzhonikidze Machine Tool Plant. The director, a Mr. Kozichev, is facing the camera. Portrait is of Ordzhonikidze for whom the plant is named.

A full professor receives 5,500 rubles per month

are definitely below American standards. There are exceptions, of course, such as the little alarm clock that I had given to me as a gift. Without further adjustment, it is keeping time to within a minute per week, better than most American clocks of a similar type. However, as to heavy goods and industrial products—in many cases these are rather good. I won't say they are equivalent to U. S. standards, but they are quite close.

But there are many things that they just do not seem to know how to do. For instance, they don't seem to know how to lay a good wooden floor; or how to build a good, substantial building. And the women's clothes are pretty dreadful by American standards.

Q: **Well, what about the general production rate? Does it match our standards?**

A: Production of many items, at least in many of the plants we saw, is low by our standards. They are only producing 120 passenger cars per day at the Gorki Plant, whereas we produce by the tens of thousands. And, incidentally, I don't think that the ordinary Russian engineers will ever believe this if it is just *told* to them. They would have to be *shown* the U. S. production lines to be convinced. On the other hand, though, they are turning out machine tools at a very good rate.

Q: **Did you find any of the specific products or processes you had the chance to examine to be of marked inferiority to those of the United States?**

A: Well, after we returned to this country I had some tests made on some ball bearings from the Kagonovich State Ball Bearing Plant. They were inferior to our best quality, but are probably satisfactory for ordinary commercial grades. I also had some tests run on a bicycle nameplate from the Gorki Plant, and there the quality was quite poor. But then it isn't a serious matter if a bicycle nameplate doesn't stand up.

A gear cutter at the Experimental Scientific Research Institute for Metal Cutting Machine Tools. A number of gear cutting and gear grinding machines are being developed at this Institute.

Q: **Were there any places where you detected marked superiority in products or processes?**

A: Let me answer that a bit lightly by saying that the only really superior "products" I found during my visit were the Russian ballet and Russian caviar. We did see some processes that were unique or showed better development, however. The storage element in use on the automatic ball bearing line at the Kagonovich Plant, for example, appeared to be better than any such device that I have seen in America. But such cases of superiority seemed to be few and far between.

Q: **What about the question of obsolescence in the Soviet factory? Do they seem to be "on the ball" in incorporating the most up-to-date machinery and methods in their manufacturing processes?**

A: In nearly every factory you can find a few spots in which up-to-date machinery and methods are in use. Generally this represents only a small part of their productive capacity. But the important thing to remember is that this clearly demonstrates that they do have the required know-how for using the latest methods. One sees more equipment that is obsolete by our standards than you see in America. And it is also interesting to point out that the "calculation of obsolescence" is one of the functions of ENIMS, so that they are obviously looking forward to the day when they can afford to retire a machine because it has outlived its usefulness even though it is still in running order.

Q: **Were the machines you observed in action largely of Russian manufacture? Or were they of foreign make?**

A: The newest and most interesting machines we observed in the Soviet Union are chiefly of Russian manufacture. We did see some machines that were foreign-made; and those that were in actual use in the factories were usually very old, or else of East German manufacture. They are currently studying some machines of Swiss manufacture, though, and I got the impression that they are interested chiefly in machines of the highest mechanical precision. We didn't see any such precision machines of Russian manufacture, but I believe they are getting ready to fill that gap.

Q: **Since your tour was immediately concerned with a study of Russian automation, Dr. Brandt, could you give us a brief word on how their development of automation compares with uses employed or being developed here?**

A: In general, I believe that we could teach them a great deal more about automation than it would be possible

Here is the University of Moscow. Dr. Brandt says that with the other buildings about 22,000 rooms are available. Many engineering students first take science courses here.

to learn from them. However, they do have a somewhat different approach to some problems. They have developed good storage devices, as I mentioned before, in place of trying to synchronize machines on the same line. I believe also that they are making more use of precise schedules for the replacement of tools and adjustment of their machines. This latter, of course, in some cases replaces feedback mechanisms, which are still in their infancy in both countries but are somewhat better developed here. The really important thing to note here is that they have found ways to make an automatic line operate. They have the know-how.

Q: **Turning from industry, Dr. Brandt, we know that you are most interested in education and that you had the opportunity to visit the University of Moscow. Would you care to give us some general impressions about what you saw?**

A: Well, let me point out that the University of Moscow includes no engineering school, although it does offer science courses from which some students later go into engineering elsewhere. It does have the finest, largest single university building I have ever seen and it is indeed a showplace. At this university, with their other buildings, they have 22,000 rooms, probably including dormitory space, and so on, and about the same number of students.

Q: **What about the university staff? Did you get any clear impression of the status of the educator in the Soviet Union?**

A: A look at their salaries might help to answer this question. Instructors are paid 1350 rubles or 1750 rubles per month, depending on whether or not they have a Candidate of Science degree, which is roughly equivalent to our Master's degree. A dozent is paid 3250 rubles per month, and this grade is probably somewhere between an associate and an assistant professor as our university staffs run in this country. A full professor receives 5500 rubles per month. This means that he is paid about twice what he could hope to make as an engineer in industry. And he occupies a position of considerable prestige.

Q: **We understand that approximately 96 per cent of the university students are paid some sort of stipend while attending school. Is this correct?**

A: Yes. Undergraduates receive from 290 to 450 rubles per month, although higher stipends may be paid for outstanding scholarship. And we mentioned a while ago that the graduate students get 780 rubles, which is roughly equivalent to what they would receive as beginning engineers in industry.

Q: **Did there seem to be much graduate work going on at the University?**

A: Yes; there seemed to be a good deal going on. Eighteen hundred students, I was told, are taking post-graduate courses. And this was in addition to the 22,000 undergraduates.

Q: **Could you draw any comparisons between the Russian students and typical American students?**

A: No more so than you could draw between any other segments of our respective populations. One thing,

(*Continued on page* 45)

About Dr. Brandt . . .

Dr. Brandt

Dr. Weldon H. Brandt joined the Westinghouse Research Laboratories in 1936 upon receiving his Ph.D. degree from the University of Illinois. After one year with the Laboratories, he transferred to the Westinghouse Materials Engineering Department where he was concerned with the development of magnetic alloys. From 1941 to 1945, he supervised work on magnetic materials, high temperature alloys, and a wide array of general materials problems.

In 1945, Dr. Brandt became assistant manager of the Materials Engineering Department. A year later he was named manager of Special Products Engineering and given responsibility for development programs involving servos and control. In 1954 he became manager of the New Products Engineering Department, and out of this came Cypak static switching systems for industrial control applications, now the responsibility of the Director Systems Department of which Dr. Brandt is engineering manager.

Dr. Brandt is a member of the American Institute of Mining and Metallurgical Engineers, the American Physical Society, and Sigma Xi.

Editor's Note: **This Is Another of a Series of Articles on Professionalism in Industry in Action. If You Didn't Read The Dow Story in the December Issue, Do That Now and Then Read . . .**

Professionalism in Industry: Personnel Problems

By Herbert R. Northrup,
Vice President, Penn-Texas Corporation

THE engineering crisis is the result of a desperate under-supply of talent. Twenty years ago, the Bureau of Labor Statistics found that 10 per cent of all engineers were unemployed, and about double that number were performing non-professional work of a lower status. Today we are not only faced with a serious shortage of engineers, but, assuming the prognosticators are more accurate than they were twenty years ago when they were advising college men to stay out of engineering, we may expect that we shall be short of engineers for at least the next decade. And, if ordinary engineers are in short supply, experts in special lines and heavily experienced personnel are almost completely unavailable through usual or ordinary channels. It follows, therefore, that personnel administration for engineers must be geared, not only as a tool for procuring engineers and then keeping them happy once they are on the payroll, but also—and much more important—as a means for maximum utilization of the engineers who are on the job.

PERSONNEL ADMINISTRATION for the engineer, as for any other employee, begins with proper selection. This may seem laughable at a time when anyone who blandly states that he is an engineer, is promptly hired at many times over what he was making at his former working place. Actually, selection today is as important as it ever was. And, when I say selection, I do not mean pirating.

The article by Mr. Northrup is based on a paper presented at a panel discussion at the 364th Meeting of the National Industrial Conference Board in New York, January, 1956. The Conference Board will shortly issue a comprehensive study of the engineering unionization question, including all the papers presented at the recent panel discussion. The comments in the article by Mr. Northrup are the result of his general study and experience (see the author's biography on page 18) and do not relate to the Penn-Texas Corporation with which he has been associated only a short time.—Editor.

No matter whether skills are in short supply or not, a square peg does not fit into a round hole. Employment of people unqualified for the job not only leads to bad workmanship, but, more important, to bad morale throughout the plant. No effective employee likes to see an unqualified person working next to him with the same title and presumably a comparable salary. Few things have led to more turnover in engineers than the wholesale hiring of inadequate personnel—unless it has been the phony promises made to engineers by over-eager and under-scrupulous recruiters.

If the reader has not read the advertisements for engineers in the papers of late, I suggest he pick up a copy of The New York *Times* some Sunday and do so. One finds the most amazing promises made to prospects. Why, the Southern California airplane manufacturers even promise sunshine! I guess they figure that by the time they get them out to Los Angeles, the smog may disappear and everyone will bask happily in the sunshine ever after.

Of course, we in the East cannot be too holy about this thing. I understand that plants out in Long Island, or even New England, are promising good commuting to any engineer who joins their force—not to mention top salaries, free time to pursue their own individual courses, a dream cottage, and a ride on the first rocket which goes to the Moon.

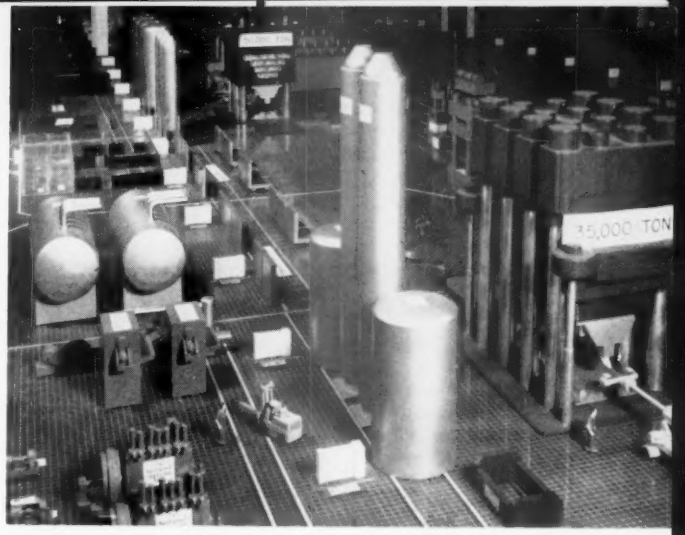
Joke about this fantastic advertising as we may, the fact remains that it is only high class piracy and sometimes not too high class at that. It creates problems for the company from which the engineer is pirated, and it does not give the engineer who is pirated or any of his new colleagues much confidence in the promises of the company whose recruiting methods are short-sighted at best, and lacking integrity at worst.

While we are on the subject of recruiting, let us look at college recruitment. It appears now that any engineering student who does not have a job by the time he is a junior is likely to be a social outcast. By the time he is graduated, he may have had two salary increases and a paid-up pension plan. If he has not been successful in achieving all this, there is certainly a recruiter who will promise it and more.

In the meantime, the engineer who had the misfortune to go to work five or ten years

ago may be plodding along getting himself an increase whenever the local union has won one for the rank and file. To say that this is a situation requiring the attention of management is probably the understatement of the year.

A recent writer remarked that there are three kinds of engineers: those about to take jobs, those on the job and those looking for a new job. I suggest that management should spend as much thought on how to hold the engineers it has as it does on how to obtain new ones. Among the first things that require attention are the salaries of engineers who have been on the job upwards of five years. The starting salaries of engineers have risen considerably faster than the salaries of experienced engineers who have stayed on the job. Yet, experience is something that no college can hand out with a B.S. degree.



The author feels that engineers should be treated as members of the management organization. Engineers, as part of the management team, planned the Alcoa heavy press plant shown in model layout above.

THERE is an old adage in industrial relations which states that people are more concerned about what the other fellow is paid than what they receive themselves. The situation probably is not as bad as that claimed by an engineer with ten years' experience who remarked that he was going back to the college from whence he came and meet the company recruiter so he could get a good job. The fact does remain, however, that starting rates are much too close to rates paid for experience. In many plants this has led to dissatisfaction and turnover. The engineer who has been recently recruited finds that his salary is so close to that of his superior that he cannot get ahead except at a painfully slow pace. And, when the experienced men find out what the recruits are being paid, they begin to read the want ad pages with renewed interest.

All of this has been more in the nature of some caustic comments on present practice rather than a constructive program for the future. I believe a constructive program can be developed and operated successfully despite the aggravations of the current engineer shortage. I believe also that the development and operation of this program is a fundamental responsibility of management.

The approach of the unions, I think, is at best a constructive irritant. The unions' role among professional employees is, and promises to be for many years to come, a minor one. Most so-called unionized "engineers" are actually draftsmen or others of less than professional rank. Since the very idea of professionalism is fundamentally eulogistic, and since unions by their very propaganda and actions emphasize (and indeed appear to believe) that "after all, we are all workers," I do not look for any marked increase in engineer-union affiliation. Nevertheless, the existence of unions ready and able to take action on the basis of discontent should serve as a warning to management, if management is not already convinced by the manpower shortage, that "business as usual" toward engineers can greatly add to the complexity of the problem.

Because the professional societies are managed by personnel drawn from the professions, who are conversant with professional ideals, practices, and aspirations, most managements, if a choice must be made, would probably prefer to deal with them rather than with unions. Yet with all due regard to the outstanding accomplishments of the great engineering societies, management cannot rely on these organizations to supply a competent personnel program. The interest of the societies in the problems of the employed engineer, as contrasted with the self-employed one, dates largely from the depression and the entrance of the unions into the engineering field. At least until recently the approach of the professional societies has been defensive in character, concentrating on securing separate bargaining units for engineers when the engineers were threatened with being engulfed by industrial unions. Although the societies have widened their horizons in the personnel field, they are not equipped to do the job for the employee-engineer which must be done today, and which only good management can satisfactorily accomplish.

The program which I advocate has, as its basic philosophy, the premise that engineering and other professional employees should be treated, (1) as members of the management organization; and (2) as members of a profession. Thus in the first category are such items as fair compensation, practical recognition of professional personnel as part of management and appropriate methods to bring the grievances of professional employees to the attention of top management. The second group includes time and facilities for research, study, reading, publishing, and otherwise maintaining professional status; and emphasis not on day-to-day output but on ideas contributed to the long-run worth of the business.

In determining professional compensation, management might well consider these three rules:

(1) Have an objective current salary evaluation so that job content is fully considered.

(2) Pay a salary based on reasonable area-industry considerations.

(3) Keep the salary and perquisites of professional personnel well above those of the rank and file workers.

These points, of course, are all self-explanatory. As to the third, however, let me add that not only compensation but also status is involved.

Professional employees like to feel that they are a part of management as indeed they are. Many top managements, by failing to consult them on programs and policy, encourage them to think otherwise. Some of the most successful personnel programs dealing

with professional employees have utilized monthly meetings with top management at which production and research requirements are fully discussed and the ideas of both professional personnel and top management are brought out. Other plants prefer regular informal gatherings at which professional employees are taken into top management's confidence concerning production plans and urged to express their opinions frankly. The results not only have raised the morale of professional men, but have taught top managements something about the technical requirements of their companies' productive processes.

Professional workers, like other employees, have grievances. Adequate machinery needs to be developed to bring their worries to light and to remove them promptly. For on the cooperation of these men much of the future of industry depends. The type of grievance machinery can vary. In small plants the "open door" may suffice: in large companies more formalized channels would seem called for.

If it is true that workers in general want recognition as human beings, as well as economic satisfaction in return for their labor, it is doubly true that professional personnel require such recognition. One large concern, for example, found that despite high compensation and the best working conditions, the morale of its engineers was at a very low ebb. For some years these men worked as a team in perfecting highly important instruments for the armed services. But although this work was very interesting during the first two years, it became rather routine thereafter.

To individuals who have achieved professional status by reason of superior abilities and long study, routine work is horribly depressing. Realizing this, the company at its own expense authorized each member of its engineering staff to spend a portion of his time for six months in developing ideas he had gained from his experience on defense work. The company then held a conference at a prominent winter resort where each man read a paper on his experiment or project and was then joined in a general discussion by other members of the staff. The result was threefold: (1) an immense improvement in the morale and enthusiasm of the company's engineers: (2) a sharp decline of engineer turnover: and (3) a body of scientific knowledge which vastly aided the company's expansion program and which could not possibly have been obtained otherwise.

The rapid advance of scientific knowledge makes it extremely difficult for a professional person to keep abreast of his field. The more conscientious must spend evenings reading the latest books and journals: others let them slide, and their work (and the company's) suffers. Many concerns have found that it pays dividends to provide library facilities, subscribe to the required books and journals, and give professional employees time to keep up-to-date with developments in their field. Some go even further. Taking a leaf from the universities, a few companies grant professional employees sabbatical leaves to pursue graduate study, to engage in research, and to publish findings.

Professional personnel have considerable interest in attending conventions of their societies. Although such meetings may be longer on job offers than on professional knowledge, a good personnel program is a mainstay against such job offers and will permit liberal provisions for convention attendance.

Likewise, liberality pays off in regard to patent policies. If a new technique is really valuable, it is equally valuable to keep the inventor well satisfied.

Finally, management will do well to avoid attempting to evaluate professional employees on a day-to-day production basis. The contribution of ideas cannot be measured on an output chart; yet they are often most valuable to a company's future progress. Above all, it is important to make sure that plant managers or supervisors do not apply ordinary valuation standards to professional personnel. Failure to observe this rule may invite engineers to look to greener pastures.

No personnel program, however good, can create engineers if engineers do not exist. It will, however, go a long way towards assuring a company of maximum availability of the potential. Nevertheless, combined with such a program as enunciated here is the need for more effective utilization of engineering talents than is typical. For example, we must get used to the idea that we cannot spare engineers as salesmen when we need them as designers. This means that we may have to pay engineers enough so that they will not want to be salesmen. I realize this is heresy but it is also reality.

In conclusion I would emphasize my belief that no personnel program, whether it be for engineers or for the rank and file, can hope to achieve its objectives if the management organization is not clearly established and defined. Today many companies lack a sound personnel administration program for engineers because they do not have an organization which is either capable of inaugurating such a program or of doing the job if inaugurated. The program which I have written about assumed an organization properly set up to give the line the ability to carry out a program designed with the assistance and cooperation of the personnel department and other staff specialists.

It also goes almost without saying that such a program as I have outlined here requires the complete backing of top management and by that I mean the No. 18 boy and no undercutting down the line, if the program is going to succeed. Moreover, the complete backing of top management means that top management must be willing to spend a little now for the future—an investment in people and ideas, so that production can be maintained and costs controlled in years to come with ideas sprouted and developed by a competent engineering force working at maximum capacity, thanks to a sound personnel program.—***End.***

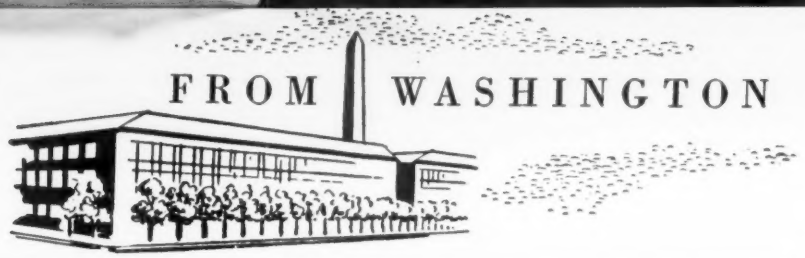
About the Author . . .

Herbert R. Northrup

Herbert R. Northrup, vice president for industrial relations of the Penn-Texas Corporation with headquarters in New York City, is a graduate of both Duke and Harvard Universities. He received his A.B. from the former in 1939, and an A.M. and Ph.D. in economics from the latter in 1941 and 1942 respectively.

He taught economics at Cornell for one year and then served as an economist and senior hearing officer with the National War Labor Board from 1943 to 1945. He was assistant professor of industrial relations at Columbia, 1945-49, and then labor economist, National Industrial Conference Board, 1949-52. He joined Ebasco Services, Inc., as a senior industrial relations consultant in 1952, leaving to assume his present position on December 1, 1955.

Dr. Northrup is also the author of many articles and three books. The latter include *Unionization of Professional Engineers and Chemists*, published in 1946.



By
Milton F. Lunch,
N.S.P.E.'s Legislative Analyst

ENGINEERS AND THE PEACEFUL ATOM

ALTHOUGH the emphasis and investment in atomic energy continues to center on military aspects, there is a growing interest among Washington officialdom in the problems and controversies surrounding plans for long-range peaceful utilization. Not the least of the problems is the training of adequate numbers of nuclear engineers and scientists.

Approximately one year ago the Congressional Joint Committee on Atomic Energy appointed a panel of distinguished citizens to study the Impact of the Peaceful Uses of Atomic Energy. The nine-man panel was headed by Robert McKinney, a New Mexico publisher. Five of the other members are noted figures in the engineering world. They are: George R. Brown, president, Brown Engineering Corp., and executive vice president of Brown & Roots, Inc., of Houston, Texas; Sutherland C. Dows, president and

T. Keith Glennan

Samuel B. Morris

chairman of the Iowa Electric Light and Power Co., Cedar Rapids, Iowa; John R. Dunning, dean of engineering, Columbia University; T. Keith Glennan, president, Case Institute of Technology; and Samuel B. Morris, general manager and chief engineer of the Los Angeles Department of Water and Power.

The panel has now submitted its report in two volumes —the first consisting of 155 pages of comment and recommendation on numerous aspects of the peaceful uses of atomic energy, and the second, a 749-page volume devoted to the background material which was the basis for the report. Anyone interested in the myriad problems associated with this subject would do well to obtain the two volumes, which are available from the Government Printing Office.

The study started with a recognition by the panel that it had to limit its review or "our efforts would be diluted to the point of ineffectiveness." Accordingly, the study developed six principal peaceful uses of atomic energy for consideration: power, medicine, agriculture, food preservation, propulsion, and general industrial uses.

It is recognized in the report that one of the limiting factors in making progress in the fields covered by the study, or in other fields of atomic development, is present and potential specialized engineering and scientific personnel. In discussing the personnel need, however, the panel sounds a word of warning against hasty conclusions: "Having noted the need for more nuclear scientists and engineers, and having noted that present college programs are not adequate to supply them, the consideration of various alternate solutions is in order. An all too normal tendency is to 'view with alarm,' to consider every problem in every field a crisis, and to call for crash program solutions."

To this sober analysis, the panel adds: "America's multitudinous forums of public opinion are now at work on the important task of searching for an answer to the problems of higher education in a free society. We believe the Nation will find the answer in a variety of ways, not in any single master plan." And the panel also added the observation that while nuclear scientists and engineers will be important to the Nation in the years ahead, it will also be important to train scientists and engineers in many other specialties as well. "Further, scientists and engineers are an important element, but only one of the elements of a free society. Our social sciences and cultural arts need equal emphasis to aid us in adapting to conditions and tensions of the atomic age—both military and peaceful."

According to the report, the Atomic Energy Commission estimates that it is currently employing about 3,600 scientists and 2,500 engineers, through contractors, who are primarily or partly engaged on peaceful application of atomic energy. The panel notes that "these are small numbers, when compared with the scientific and engineering manpower reservoirs of the Nation." The total of all scientists, engineers, and related managerial personnel employed by the Commission and its contractors totals

less than 20,000 people, to which the panel comments: "It is important to note that this is the full demand of professional skills for the conduct of a program involving several hundred millions of dollars of operating expenses per year. The number of graduates in these particular fields, however, do not keep pace with these needs."

The Nineteenth Semiannual Report of the Atomic Energy Commission, issued in January, 1956, adds some interesting scientific and engineering personnel statistics based on a survey of training and manpower requirements in the atomic energy industry for the next 3 years. Data were collected from 201 industrial concerns having an established or potential interest in atomic power applications and from AEC Operations Offices and prime contractors. The survey disclosed that in the next 3 years in the United States alone there will be an annual demand for approximately 2,000 engineers and scientists—mostly engineers—in the atomic power field. Of these 2,000, it is expected that approximately 1,200 will already be trained in nuclear technology. The AEC states that there are in the United States approximately 5,000 engineers and scientists effectively trained to work in the new atomic industry. But, the AEC adds, present nuclear educational and training programs of all types are geared to turn out fewer than 500 engineers and scientists annually. "As a consequence," the AEC says, "on the basis of the short range requirements alone, there is an immediate need to expand education and training capacity."

A further statistical projection of importance is contained in the panel's report, based on the assumption of 83 million kilowatts of atomic electric power generating capability by 1975. On this basis, a total of 16,000 scientists and engineers would be required to design, construct, and operate the plants as well as related fuel fabrication and chemical processing facilities.

The panel's comment on this estimate is: "We would not be alarmed at the prospect of educating 16,000 scientists and engineers required in gradual development of atomic power over two decades, if it were not for the burgeoning demands for large numbers of highly qualified technical people throughout all fields in industry and Government. The provision of faculties and facilities to meet the needs is a task requiring the diligent efforts of educators, industry, and where necessary, Governmental agencies."

Although the evidence indicates a serious shortage of qualified scientific, engineering, and technical manpower in the atomic-energy field, the panel states, "these shortages to date result more from the competition of large and continually expanding atomic military programs than from activities in the peaceful uses." Only through having an adequate supply of the specialized personnel can we avoid one program's stealing from the other, the panel states. To meet the problem, the panel notes the need for modernization of basic science courses and, where necessary, the reintroduction of science and mathematics courses in the elementary and secondary schools. Also, the panel refers to the need for motivation of substantial numbers of competent high-school students not now planning to enter college. And finally, reference is made to "making certain that lack of financial means does not prevent able and interested students from being trained expeditiously to the limits of their capabilities."

Sutherland C. Dows

George R. Brown

John R. Dunning

Whatever limitations are imposed by present secrecy rules on other aspects of the development of the peaceful uses of atomic energy, there can be no doubt that sufficient information now exists in unclassified form to serve as texts for the most advanced college courses in nuclear science and engineering, the panel states. The specific recommendations of the panel in this aspect of the future of atomic energy for peaceful uses are preceded by their word: BALANCE. The four specific recommendations are:

"1. The encouragement of orderly and determined efforts on the part of all concerned to increase the output and improve the quality of scientists and engineers capable of contributing to the development of peacetime atomic uses.

"2. That the Commission continue support of university research and graduate study; we urge that private enterprise likewise give them support.

"3. That the facilities of the national nuclear laboratories be made more widely available to support college training programs.

"4. That recognition be given to the need for additional research reactors and other facilities; in addition to facilities required for use on college campuses, we would consider it wise to design, locate, and operate future research facilities, and especially reactors, in such a way that they can be of the greatest use to the greatest number of college and graduate students."

New Building Dedicated in Washington; Iowa, Mississippi Affiliate with NSPE

THE Spring Meeting of the National Society of Professional Engineers was a gala affair highlighted by the dedication of the new headquarters office building and a pre-Engineers' Week "kickoff" banquet as well as the usual professional and business sessions.

A day-long meeting of the NSPE Executive Committee took place on February 16. The first general session of the Board of Directors was called to order at nine a.m. on the 17th by NSPE President Allison C. Neff, who then gave a report on the eight months of his tenure, noting membership gains and commenting on the progress of various programs of the Society. It was also announced that the Mississippi and Iowa Societies had voted to affiliate with NSPE, and the Board received and acted favorably on their petitions for affiliation.

The consideration of the various committee reports was adjourned for the usual Regional Luncheons presided over by the six NSPE vice presidents, and then resumed prior to the dedication of the new building at 2029 K Street, N. W.

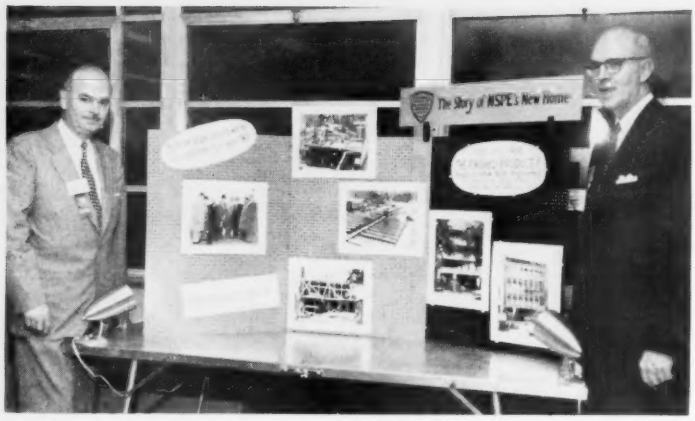
The dedication ceremonies took place at four o'clock on the afternoon of the 17th and were attended by many prominent Washington engineers and civic leaders. Past President Clarence T. Shoch acted as master of ceremonies for the dedication. The invocation was given by the Reverend John F. McClelland of Christ Congregational Church. Brigadier General Thomas A. Lane, the Engineer Commissioner of the District of Columbia, extended official greetings in a brief address. Then President Neff spoke, giving a history of the planning and construction of the headquarters and emphasizing the service and aims of the Society.

IN his dedicatory remarks, President Neff quoted a statement made by National Director L. E. Easley of Indiana in describing the building. "To me," Mr. Easley had written, "this building means more than a structure in which to house our headquarters staff. I feel that it has become and will stand as a monument to our profession and that all professional engineers with sincere purpose will look upon it with a feeling of great pride as the 'Mecca' of our profession. The clean square lines bespeak the ethical; the sturdy appearance of the 'surround' denotes strength and solidarity, and the open front seems to extend an invitation to the professional engineer to enter into the wide scope of representation offered by the Society. Its appearance is truly representative of the professional mind."

President Neff then cut the ribbon, officially opening the building for the inspection of the guests. A reception followed the ceremony.

Friday was also marked by the NSPE Spring Banquet —the first of the coast-to-coast Engineers' Week series— at which Harold E. Stassen, special assistant to President Eisenhower, was the guest speaker. In his address, entitled

Left: A partial view of the crowd that saw NSPE President Allison C. Neff (under shield) and other dignitaries dedicate the new headquarters building in the Nation's Capital. Below: A close-up of the dedication scene showing from l. to r. Rev. John F. McClelland; Brig. Gen. Thomas A. Lane, the Engineer Commissioner of the District of Columbia; Immediate Past President of NSPE, Clarence T. Shoch; and President Neff.



NSPE President Neff, left, and Past President Shoch look over a display depicting the construction progress of the new building during the reception held at the dedication.

Building a Just and Durable Peace, Mr. Stassen paid tribute to the role of the engineer in contributing to the safety and security of the free world and commended NSPE for "the direct value of your constructive activities to America."

Mr. Stassen, who is often called "The Secretary of Peace," cited an eleven-point program which he considers essential to the building of an enduring peace. Among the points he urged were restraint and patience in the attitudes and actions of nations, maintenance of adequate U. S. strength both for defense and the deterrence of aggression, preserving a strong, sound economy, opportunity for all peoples to advance their standards of living under conditions of peace, an increased exchange of knowledge, and goods and mutual respect for other cultures, and the curbing and eventual end of the competitive arms race.

Mr. Stassen also stressed the importance of improving our educational system so that more young people are encouraged to embark on technical careers. "To a greater extent than heretofore," he said, "mathematical concepts must be introduced into school curricula in the early, formative years."

Representative Carl Hinshaw of California was another featured speaker who stressed the need for improved educational standards. The Congressman spoke at the luncheon on Saturday, Feb. 18. During the course of his address, which was entitled *Engineering Adventures in the Atomic Age*, Mr. Hinshaw, who is himself an engineer, urged the inclusion of nuclear engineering courses in graduate schools and the establishment of more specialized training centers like the Oak Ridge School for Reactor Technology. He also asked for more emphasis on mathematics and the physical sciences in the nation's high schools and commended President Neff for the letters he sent recently to eight hundred of the country's newspaper publishers calling attention to this scholastic need.

In addition, Representative Hinshaw gave a detailed analysis of the scope of the engineering challenge of the atomic age, emphasizing in particular the altered concept of efficiency that the atomic revolution is bringing about. He also discussed the desirability of decentralization of industry from the standpoint of civil defense.

A SPECIAL social program for the ladies attending the meeting was arranged by a committee headed by Mrs. William Hepburn. Other members were Mrs. Wallace Barlow, Mrs. Scott Heider, and Mrs. George Campbell, whose husbands are members of the District of Columbia SPE. The highlight of the ladies' schedule was a luncheon at the Windsor Park Hotel on the 17th, at which the Honorable Fernando Lobo, Ambassador to the organization of American States, was the guest speaker.

Members of the District of Columbia SPE joined in acting as hosts for the meeting. The local officers are: Frank L. Martin, president; Oscar H. Beasley, first vice president; Robert Morris, second vice president; Max H. Morris, treasurer; and Michael Harring, secretary.

The professional sessions continued through Saturday afternoon when the meeting was finally adjourned. Highlights of the official reports and action taken by the Board follow.

CHAPTER ACTIVITIES

The Committee is continuing its program of publication and distribution of Chapter Monographs begun last year.

Since the last Board Meeting a Monograph on "*Functional Group Activities*" has been distributed to State and Chapter Officers and was included in the mailing to 6,000 consulting engineers.

A Monograph on "*Meeting Programs, Attendance, and Fellowship*" is now ready for distribution. A Monograph on "*Indoctrination Conferences for Chapter Officers and Committees*" is completed but is being held for distribution at the coming State Presidents' Conference along with the Monograph on "*Organization for Effective Action.*"

A Monograph on "*Effective Public Relations*" has been turned over to the Public Relations Committee for review. A Monograph on "*Membership Promotional Methods*" has been converted into a Monthly Membership Memo to be distributed in September 1956.

The Committee is obtaining sufficient copies of an outstanding Year Book published by the Fresno Chapter, CSPE for distribution to all chapters. It will spotlight what can be done by a smaller chapter at very nominal cost.

The Committee is also preparing Monographs on:

1. Education
2. Legislative Committee Activities

Board Action: Report Received.

CONSTITUTION AND BYLAWS

Your Constitution and Bylaws Committee has been requested to consider the following three problems: 1. Provision for the creation of the additional office of Assistant Treasurer, to insure against an emergency situation wherein the Treasurer may be unable to perform his duties; 2. Provision for validating applications of Professional Engineers, licensed in Canada, as Members-at-Large; 3. Study of the Functional Group problem in cooperation with other interested Committees.

We offer here our recommendations covering the first two matters. We believe we are prepared to proceed promptly on the third matter, as, if and when instructed by this Board, or requested by any other Committee.

President Eisenhower's Special Assistant, Harold E. Stassen, addresses the banquet of NSPE's Board of Directors and guests. Also visible at the head table are, l. to r., Mrs. Robert J. Rhinehart, President Neff and Mrs. Neff.

We recommend the adoption of the following proposed amendment to Bylaw 4, paragraph c, Treasurer: Add a second paragraph under c, as follows: "Assistant Treasurer. The President shall annually appoint an Assistant Treasurer. This appointment shall be subject to confirmation by the Board of Directors. He shall serve only in the event of the Treasurer's absence or inability, as determined by the President, to fulfill the duties of his office. The Assistant Treasurer shall be a member of the National Society of Professional Engineers, in good standing, legally qualified, and personally available. All applicable provisions of the preceding paragraph will be effective should the Assistant Treasurer find it necessary to assume the duties of the Treasurer."

We recommend approval of the following proposed Amendment to Article IV—Membership, Section 6: Amend the third sentence of this section to read: "A Professional Engineer, residing or practicing in a State wherein no Member State Society exists, *or a Professional Engineer who is registered according to the laws of any of the Provinces of Canada,* may become a Member-at-Large."

Board Action: Report Approved.

ECPD-NSPE RELATIONS—

The NSPE-ECPD Committee presents for approval Resolution 2-56.

The actions of the constituent societies of ECPD in regard to NSPE affiliations are as follows:

1. ASEE—approved
2. AIEE—approved
3. NCSBEE—approved
4. EIC—no action: as previously reported considers matter a U. S. matter and will vote with majority.
5. ASCE
6. AIME
7. ASME
8. AIChE

(5–8) action is understood to be dependent upon receiving a proposal from NSPE.

The NSPE group of the NSPE-ECPD committee feels that we should present a proposal to eliminate the present stalemate.

If two of the four approve and the EIC follows through as already indicated, the necessary six approvals will have been obtained.

The committee feels that the proposal should be submitted so that the matter may be brought to a head, and recommends adoption of Resolution 2-56.

Board Action: Report Approved. (See Resolutions)

EDUCATION

It is gratifying to report that more interest is being developed in the re-evaluation of objectives in Engineering Education than at any time during the past century. Your Society is collaborating in this movement and through its Education Committee is endeavoring to stimulate interest in those phases which appear most vital, of lasting importance, and upon which the future of the engineering profession depends. . . .

One State Society at its annual convention this year devoted the entire professional program to the subject of "Engineering Education." This program consisted of a round-table discussion directed toward the topic, "The Professional Engineer's Part in Stimulating and Maintaining Interest in Science and Mathematics in our High Schools." The subject was debated by a panel consisting of a consulting engineer, an engineering educator, a superintendent of schools in a large city, and a business man who is a member of the school commission. This session of the Society was attended by the largest group ever to assemble in this particular state for an annual meeting. The program was most enlightening to all who attended, and particularly the members of the panel.

A recent development from the standpoint of promoting better secondary education was recently initiated by the Ohio Society of Professional Engineers through the formation of chapters of "The Future Engineers of America." These chapters are being organized in the various high schools throughout the state. The aim of the organization is "to promote information and interest in the engineering profession among high school students." In initiating the program, the students are told that they would have a chance to learn of the opportunities in the engineering field, to cultivate the qualities essential in a good engineer, to study the lives of great engineers, and to foster the development of student leadership. These chapters are not formed with the idea of recruiting engineers but rather to offer guidance to those interested in an engineering career.

In Wisconsin during the year the State Society's Education Committee encouraged their members to address student bodies of the various high schools concerning the weaknesses as well as virtues of the engineering profession. In addition some five hundred high school principals have been contacted asking that they nominate an outstanding teacher in each of the fields of mathematics, physics, or chemistry whom the Society could honor at the Annual Convention. Only fifteen per cent of the principals replied. Three teachers have been selected who were further recognized by presentation of a citation signed by the officers. It is anticipated that future educational programs of this nature will be televised. The Society has also initiated a University Committee to work closely and advise with the state engineering school.

The Illinois Education Committee has studied the status of professional engineering on the various engineering school campuses and feels there is a definite lack of professional orientation in the case of both faculty and students. There seems to be heavy compartmentation of engineering subject matter rather than a program of study based on solid fundamentals. Efforts are being made to stimulate the formation of student groups dedicated to the dissemination of professional engineering information and to high professional standards.

The Education Committee in Minnesota has functioned for nearly eight years, sponsoring many innovations of high professional importance. They have provided speakers for orientation courses at the University. They have counselled with students concerning registration laws, professionalism, and engineering knowledge. The Committee has promoted the adoption of a five-year curriculum in engineering. They have become each year increasingly active in promoting "Career Day" programs as well as encouraging the improvement of science and mathematics courses in the high schools. Through this Committee the "Cooperative Education" plan is now being studied.

The Education Committee of the Massachusetts Society recently published a pamphlet on "Engineering Education in New England" listing the engineering schools, the accredited courses, and entrance requirements. This is a most valuable and worthwhile pamphlet to be placed in the hands of high school teachers as well as prospective engineering students.

The American Society for Engineering Education in 1952 appointed a "Committee on Evaluation of Engineering Education." This Committee, selected on a broad educational basis, was charged with the task of recommending the patterns that engineering education should take in order to keep pace with the rapid developments

Know Your Society! Read These National Committee Reports.

in science and technology. The report of this committee was published in recent months and is of importance to all engineers in acquiring a better understanding of the basic problems of engineering education. Before NSPE or any other group takes steps or embarks on projects involving engineering education, we should all become thoroughly familiar with this report pamphlet, its basic philosophy, its forward looking concepts, and its acknowledged purposefulness.

The annual report prepared by H. L. Solberg, chairman of the Committee on Engineers-in-Training and presented at the August meeting of the National Council of State Boards of Engineering Examiners is another paper with which professional engineers should be thoroughly versed. It attempts through the means of the EIT examination to better define engineering and engineering-education. If states in general adopt the EIT examinations, as a yard-stick for engineering education and the subject matter agrees with the principal objectives of the course material in the undergraduate curriculum, then we have gained one objective on our over-all plan.

Concerning meetings planned for the year, it is gratifying to report that on the 25th of May at Atlantic City, through your Board of Directors and the excellent cooperation received from National Headquarters, the Education Committee is planning a rather comprehensive and objective program. An afternoon session will be devoted to a round-table discussion. The topic to be discussed will be "The Teaching of Professional Concepts in the Engineering School." As guest of the Society and participating in the program as a speaker will be a student selected from one of the leading engineering schools, which school has led for many years in the teaching of professionalism. The other two speakers are selected from the membership of PENC. The first is chairman of our National Committee on Young Engineers and the second is dean of an engineering school where an enviable record has been established during the past decade in a program involving professionalism and whose graduates have distinguished themselves nationally as well as regionally because of their acknowledged high professional standards. It is gratifying at this time to report that Dr. M. M. Boring, president of the American Society of Engineering Education will address NSPE at the luncheon meeting on May 25 with a message directed toward the general subject of engineering education.

Your Education Committee at its last meeting felt that in addition to carrying on the work which is not being conducted by the Society with its many chapters with their education committees, we should commence a conscious era of long-term planning and study. There are many subjects badly in need of study on a national scale by an organization of the caliber of NSPE such as those involving (a) the cost of engineering education and who should bear this burden, (b) to what extent is engineering education in this country gravitating toward general education at the under-graduate level, (c) how should a graduate program in engineering education be designed, (d) should engineering students be selected and by what method.

During the year, on several occasions, the desirability of a national conference on engineering education has been discussed and promoted. Your Committee is now in a position to suggest that the first steps be taken at this time toward this objective. It is, therefore, suggested that some centrally located metropolis be selected as the site for a meeting, and that all organizations, groups, and activities participating in or partaking of the fruits of engineering education be invited to participate. At this time your Committee sees the potentialities of a two-day meeting with papers prepared by outstanding individuals from all phases, levels, and degrees of professional engineering. Many of these papers will be selected for presentation at this meeting. Particularly qualified individuals will be selected to participate in debate and discussion. It is anticipated that if the Officers and Directors approve a National Conference on Engineering Education, the Society will cooperate with and solicit the cooperation of the American Society of Engineering Education, the U. S. Office of Education, ECPD, and others interested in our objective.

Board Action: Report received.

EMPLOYMENT PRACTICES—ENGINEERS-IN-EDUCATION SUBCOMMITTEE

The Committee does not have any recommendations to the Board at this time but wishes to report the progress to date.

Initial comment and suggestions have been received by the chairman from all committee members after study of the Board's directive to the committee. A copy of this directive is reprinted below and forms a part of this report.

It is recognized that many salary surveys have been conducted in the past by various organizations and perhaps others are contemplated. The committee wants to make certain, therefore, that any additional survey by NSPE would not be duplicating work done by another group or groups whose findings are available to us. Consequently, it appears necessary to secure and study data from other surveys before recommendations are made and this is the task being undertaken by the committee at the moment.

* * *

The subcommittee is faced with a dual responsibility: that of coordinating its work with the NSPE Education Committee, at the same time confining its efforts to the employment conditions inherent in the teaching field.

It has a mandate from the Board at the last meeting to study ways and means and to develop a program, if possible, for raising the standard of remuneration for teachers of engineering such that it is comparable with that of teachers of other learned professions such as law and medicine.

Undoubtedly, its first step should be to attempt to secure statistics for comparison purposes. While an over-all figure is available through the NSPE Salary Survey, it must be recalled that this is not too suitable for comparison for two reasons: (1) The level of membership in NSPE in the teaching profession is heavily weighted in the higher ranks of the engineering teachers, being predominantly the deans and full professors; and (2) The NSPE Salary Survey does not provide for a breakdown into the usual academic classifications of instructor, assistant professor, associate professor, professor, head of department, and dean. Perhaps the committee would think a survey of the engineering colleges to secure these statistics would be a desirable activity on the part of NSPE. Another important aspect of such a study would be to determine the basis of compensation—on a nine, ten or twelve month basis—and any provision made for additional remuneration for teaching night school, summer school, or for research.

An item mentioned in discussions at the recent meeting of the American Society for Engineering Education is the amount of time permitted faculty members for outside employment. The most common form of such employment, of course, is consulting work; but in metropolitan areas, for example, there may be opportunities for specific industrial employment for short periods of time.

The subcommittee should consider what program NSPE should follow in this important area, not only in serving the engineering teachers but in implementing the directive from the Board on improving the remuneration for such work.

Board Action: Report received.

EMPLOYMENT PRACTICES—ENGINEERS-IN-EMPLOY-OF-PRIVATE-PRACTITIONERS SUBCOMMITTEE

The Subcommittee has had one meeting since its formation. The meeting was held in Chicago on January 14, 1956. Inasmuch as this was the first meeting of the Subcommittee, and, in fact, the first meeting of any Committee in NSPE to consider specifically the problems of engineers employed by private practitioners, the meeting was devoted primarily to consideration of background material and the formulation of plans for constructive Subcommittee activities.

Chairman Blackburn of the Employment Practices Committee briefed the Subcommittee members on the work of the Engineer-in-Industry Subcommittee, and particularly on that Subcommittee's current work in developing a Criteria or Standards of Professional Employment. After an extensive review of the current status of that project, and a discussion of the various major points to be covered in such a Criteria, it was determined that an effort should be made to develop the Criteria to cover also employment standards for employees of private practitioners. This may require the inclusion of certain additional points which are not necessarily applicable to industrial employees, and it may also require the use of some explanatory notes to identify differences by types of employers and size of firms. Chairman Blackburn indicated that the Education Subcommittee and the Engineers-in-Employ-of-Government Subcommittee might also be able to tie in with the proposed Criteria. If this is feasible, it was felt that it would be well to have one published Criteria for all engineering employment, with editorial treatment to distinguish basic points of difference according to the type of employment.

To implement this plan of coordination, the following steps will be taken:

1. The Chairman of this Subcommittee (or his alternate, when necessary) will be invited to attend future meetings of the Engineer-in-Industry Subcommittee.
2. All letters and materials concerning the development of the Criteria will be exchanged between the Subcommittees which will participate in its development.

After a general discussion of the type of information now available regarding the status of engineers employed by private practitioners, it was decided that it would be highly beneficial, both to the engineer employees and to the consulting engineers, to conduct a simple survey limited to this group. The survey would be conducted by questionnaire to the consulting engineering firms on plates in the Washington office (approximately 1,700). Each firm would be asked to supply information as follows:

Number of engineers employed, divided between Registered Engineers, Non-Registered, and Engineers-in-Training.

Range of salaries paid according to the Standard Grades published by NSPE. The range is to cover low, median and high.

Geographical location of firm (main office) according to state and size of city.

Check list of fringe benefits provided.

(Tentative)—Standard work-week in hours, and overtime pay policies and practices.

The consulting firms supplying this information would not, of course, be identified in any way; and the firms would be notified that each will be supplied with a copy of the results of the survey.

It was estimated that the survey in the form contemplated by the Subcommittee would cost $300 to $350. The final report could be published as a separate pamphlet, if finances permit, or it could be presented in article form for publication in the AMERICAN ENGINEER.

Mr. L. H. Cather of De Leuw, Cather & Company (in whose Chicago offices the meeting was held), participated in the meeting in the absence of Chairman Brown. Mr. Cather offered a number of excellent comments and suggestions to the Subcommittee. He expressed the opinion that the consulting engineers would cooperate in such a survey, and would find the results of considerable interest and value.

RECOMMENDATION: It is recommended to the Board that the Subcommittee be authorized to proceed with the survey as outlined.

The meeting concluded with a vote of thanks by the members of the Subcommittee to Mr. Blackburn for his excellent conduct of the meeting and to Mr. Cather for so ably "pinch-hitting" for Mr. Brown, as well as for his generous contribution of the facilities and as host to the visiting Subcommittee members.

Board Action: Report Approved.

EMPLOYMENT PRACTICES—ENGINEERS-IN-GOVERNMENT SUBCOMMITTEE

Background of the Study

From time to time there has arisen the consideration of various aspects involved in the performance of engineering services by professional engineers in the public service outside of their normal and regular employment and duties. These considerations involve outside professional practice in a consulting capacity in the evenings, on weekends, holidays, during periods of leave, and at other times when the individual professional employee is not actually on duty for the agency.

In the absence of any known previous study of the practice, it was felt that it would be beneficial to the profession and to the Government agencies to undertake a review of the practices, policies and attitudes of the agencies of the Federal Government. The anticipated potential value of such a study to the Federal agencies has been confirmed by the response of many agencies in furnishing material. A number of the agency respondents stated that the report of the Subcommittee and any findings or conclusions would be of value in a continuing evaluation of present regulations and policies. Copies of the report of the Subcommittee were requested by a number of the agencies.

Scope of the Study

To obtain the basic data from the Federal agencies a letter was addressed to the agency heads in which the purpose of the study was indicated, together with a request for a statement of the agency's policies (including published policies where available) and any comments or suggestions which the agency respondents might care to offer.

The letters were sent to the following agencies, all of which have replied: (In some cases, as shown, subordinate units within a major department or agency received a separate letter because a substantial number of engineers are employed): Agriculture Department, Rural Electrification Administration; Atomic Energy Commission; Civil Service Commission; Commerce Department, Bureau of Public Roads; Defense Department—Department of the Army; Corps of Engineers; Department of the Air Force; Department of the Navy—Bureau of Yards and Docks; Federal Power Commission; General Services Administration—Public Buildings Service; Housing and Home Finance Agency; Interior Department, Bureau of Reclamation; National Advisory Committee for Aeronautics; Tennessee Valley Authority; and Veterans Administration. . . .

Conclusions

Based upon the foregoing study, it is the opinion of the Subcommittee that professional engineers in the employ of the Federal Government should be permitted to engage in outside professional practice, on an individual voluntary basis, within the limitations of applicable law, regulations and ethical standards.

Because the application of such laws, regulations and ethical standards must necessarily be indefinite in many cases, it becomes the duty of professional personnel to be scrupulously careful of any activity which might reflect adversely on the individual, his employer or his profession. Professional engineers therefore should scrutinize carefully the applicable laws and regulations prior to undertaking outside professional activities, and should, if any doubt exists, obtain clearance from superior officers.

Professional engineers engaging in outside professional activities should also be constantly aware that their activities will reflect, favorably or unfavorably, as the case may be, upon the entire engineering profession. The professional engineer has a duty not only to his agency, but also to his profession.

It is the opinion of the Subcommittee that when a professional engineer engages in outside professional engineering activity he should, in conformity with the Canons of Ethics, base his fees upon local prevailing fee schedules or the appropriate local prevailing customary fees for such professional services.

Board Action: Report Approved.

EMPLOYMENT PRACTICES—ENGINEERS-IN-INDUSTRY SUBCOMMITTEE

Recommended for Board Action

1. Report on Council of Western Electric Technical Employees —National vs. Western Electric Company, Inc. See Extracts below. We recommend that the Board of Directors approve the attached report. Because of a time element, the report was submitted to the Executive Committee in advance and has been approved by that body. Copies of the report have been sent to the Company and the Union.

2. It is again recommended that a newsletter for the purpose of exchange of information about employed engineers and their relations with their employers be periodically prepared and distributed to selected industry, government offices, and interested members of NSPE and that a synopsis of material in each newsletter be published in the AMERICAN ENGINEER.

3. It is recommended that additional funds in the amount of $1250 be made available to the Subcommittee for the purpose of conducting two additional Subcommittee meetings during the year 1956 in order that work started might be completed.

Newsletter on Engineers' Industrial Relations

The Subcommittee's previous recommendations that a newsletter be instituted for the exchange of information pertaining to the experiences of employed engineers and their employment conditions was referred to the Executive Committee at the Memphis Board meeting, October, 1955. Since that referral the Subcommittee has given additional intensive consideration to the proposal and urges that action be taken at this Board meeting to authorize the establishment of the proposed service without delay.

It is felt that such a service to industry, government, and other employers of engineers, as well as NSPE members who desire it, is vital to support the professional development program for engineers in industry. The monthly newsletter will contain factual reports on all developments related to engineering employment conditions, including applicable NSPE policies adopted by the Board from time to time; announcement of NSPE publications in the employment practices field; National Labor Relations Board and court decisions affecting professional employees; decisions and announcements from other government agencies; viewpoints and suggestions of industrial and engineering leaders related to improvement of engineer-industry relations; significant comments and editorial opinions from magazines, association meetings, conferences, etc.; news of company practices and policies on engineering employment; news of economic developments for engineering employees, including new data on salary surveys; and such other data and information which may be of interest.

The newsletter is intended to circulate to major employers of engineers of which there are approximately 5,000 on plates in the

What Is NSPE Doing? Read These National Committee Reports.

NSPE headquarters. It would also be available to any NSPE member who requested it, without charge. . . .

Committee Meeting

The Subcommittee has met once since the October Board meeting. This meeting, which was held at Pittsburgh on November 19 and 20, 1955, had a very full and important agenda to cover:

a. Reviewed the manuscript of the excellent article published in the December, 1955, issue of the AMERICAN ENGINEER, by H. P. Cooper, Dow Chemical Company, entitled "*Professionalism in Industry: The Dow Story.*" The Subcommittee agreed to reprint this article and to circulate it to those in industrial managements whose names appear on a selected list and to officers of state and local societies. Response to the article has been enthusiastic and many reprints have been specially ordered, both by industry and by the State Societies and Chapters for additional distribution. The Subcommittee is cooperating with the Washington office in seeking additional articles on the same general theme.

b. Reviewed, as thoroughly as documentary evidence would make possible, the facts in the case of the Council of Western Electric Technical Employees—National vs. Western Electric Company. See Extracts below and recommendation above.

c. Noted that the National Labor Relations Board had deviated from usual policy as related to the professional provisions of the Taft-Hartley Law in refusing an election for the purpose of decertification of professional employees (pharmacists) from a heterogeneous union of clerks and pharmacists. At the request of the Subcommittee, Executive Director Robbins sent a request to the National Labor Relations Board for a conference to discuss the implications of the policy ruling to Professional Engineers. The Board has replied that it is studying the NSPE arguments for reconsideration, but does not feel that a meeting is necessary at this time. We are awaiting the further reply of the NLRB before deciding on additional action, if corrective action is not taken.

d. The Subcommittee developed an outline for a Criteria of Professional Employment which it expects to publish this year. This Criteria will consist of:

1. A comprehensive preamble or introduction.
2. Managerial responsibilities.
3. Engineer's responsibilities.
4. Management check list.
5. Engineer's check list.

This will probably be the most important contribution which the Subcommittee can make to NSPE this year.

e. Plans were made for a conference program for the NSPE Annual Meeting in May. It is proposed that a speaker's panel be organized for a two-hour morning and a two-hour afternoon session to discuss industry's attitude toward its engineers and to discuss the engineers' attitude toward industrial management. Four speakers have been invited and acceptance has been received from two to date.

—EXTRACTS—

RE: Council of Western Electric Technical Employees—National
v.
Western Electric Company, Inc.

Introduction

The Council of Western Electric Technical Employees—National (hereinafter referred to as the Union) is a labor organization duly certified by the National Labor Relations Board as the exclusive collective bargaining representative of approximately 3,300 (as of April 2, 1952) technical-professional employees of the Western Electric Company (hereinafter referred to as the Company) in the Company's many plants throughout the country. The Union has more recently claimed to represent approximately 5,500 employees. It is affiliated with the Engineers and Scientists of America (ESA), a national federation of collective bargaining groups of engineering and scientific employees.

On September 23, 1955, the Union filed Civil Action 104-3 against the Company in the District Court of the United States, Southern District of New York. The Union, through a letter from the President of ESA, dated October 11, 1955, has requested the National Society of Professional Engineers to intervene in the civil action *amicus curiae* in support of what is said to be an attempt by the Company to destroy the effectiveness of the so-called "professional provisions" of the Labor Management Relations Act, 1947 (Taft-Hartley Act).

The Union's request, together with supporting factual background material then available, was brought before the Executive Committee of NSPE at its meeting in Memphis, Tennessee, on October 13, 1955. The Executive Committee referred the request for NSPE intervention in the court case, together with the supporting material, to the Engineer-in-Industry Subcommittee, Employment Practices Committee, for study and report. This report is the result of that study and is submitted with recommendation for appropriate action to answer the Union's request. Before undertaking consideration of the matter, the Subcommittee directed a communication to the Company requesting such information and comment as the Company might care to submit. The Company accordingly supplied the Subcommittee with a copy of its answer to the civil action which was filed in court on October 25, 1955. The Subcommittee's comments and recommendations are based on all the material referred to above, plus the material referred to later herein.

The Issue

The gist of the Union's complaint is that the Company, contrary to the specific terms of a collective bargaining contract between the Union and the Company, effective November 30, 1954, and thereafter to date, has hired and transferred into the occupational classifications covered by the contract persons who did not and do not meet the professional qualifications defined in Section 2 (12) of the Taft-Hartley Act, and continues to do so. The Union's complaint states that the newly-hired or transferred employees (approximately 500 in number in various locations through the United States) "are decidedly below the minimum qualifications for the occupational classifications used for employees in the bargaining unit at the time of the National Labor Relations Board's certification of plaintiff (Union) on June 13, 1952, and who were and are non-professional." The Union contends that this action has resulted "in diluting the professional homogeneity of the collective bargaining unit by infiltrating non-professional employees into the occupational classifications in said unit, thereby putting plaintiff in the position of representing for collective bargaining purposes employees of a non-professional character, all to the damage and detriment of plaintiff as a labor organization consisting of and representing only professional employees."

The Company's answer moved to dismiss the Union's complaint. This motion is under advisement by the Court at the time this report is being prepared. The Company's further answer denies the Union's interpretation of the collective bargaining contract that only employees who meet the professional definition of the Taft-Hartley Act may be hired or transferred into the occupational classifications covered by the contract. The Company contends that it has complied and will continue to comply with the terms of the contract. . . .

Conclusion

Taking the NLRB decision as a whole, and particularly the language, on the one hand, which refers to all the affected employees as "professional" or "essentially professional," and on the other hand, the language which leaves a strong impression that the group was a mixture of professional engineers and technicians, it does not seem possible, at this date, to come to any firm conclusion as to the professional composition of the Union on June 13, 1952, the critical date referred to in the contract. Also, some of the occupational titles leave a strong impression among those who are experienced in engineering classification and assignment in industry, that the group includes some jobs which are normally the function of technicians, as distinguished from professional engineers.

The Subcommittee does not believe that it, or any other group, on the basis of this conflicting history and record can decide with any justification whether the newly-hired or transferred personnel into the unit will reduce the minimum qualifications for the occupations classifications in effect on June 13, 1952. Perhaps this can be determined by a court of law, but only after very exhaustive and extensive testimony as to the professional composition and level of the group on June 13, 1952, and the same analysis as to professional composition and level for the newly-hired or transferred employees.

The Company does not contend that the newly-hired or transferred employees are "professional" as defined in the Taft-Hartley

Act. One paragraph of the Company's statement, quoted below, may be reasonably interpreted to admit that such personnel are not within the professional definition.

> "What plaintiff hopes to accomplish by this litigation, and has unsuccessfully attempted to accomplish by collective bargaining, is to require that the Company employ in certain categories only what the Union regards as professional engineers. It is a matter of common knowledge that at present there is a great shortage of engineers. Such talent must be drawn not only from graduates of engineering schools but from persons whose experience or other qualifications makes them able to do particular jobs efficiently. This was true at the time the bargaining unit was set up and the Company has not deviated and does not intend to deviate from the minimum qualifications then in effect. It would be contrary to the public interest to limit the Company in its assignment of the technical and engineering talent available."

The National Society of Professional Engineers has consistently taken a strong stand in favor of professional separation and the right of truly professional engineers to decide their own fate in employment relations as professional individuals without having their decision influenced by the inclusion of non-professionals. This principle is applicable whether the question is voting for collective representation or against collective representation.

The best that can be said of the situation in this case is that there is a reasonable doubt that exclusive professional composition ever existed in the organization, or exists at this time. Under these circumstances, the question does not involve the principle of professional integrity, but becomes one solely of a legal nature to determine whether a particular contract has been breached. Such a determination is for the courts.

Recommendation

We recommend that the National Society of Professional Engineers decline the invitation to intervene in the case *amicus curiae*. We further recommend that a copy of this report be furnished to the Union and to the Company, together with the thanks of the National Society of Professional Engineers for supplying the information and documents which were essential to a detailed study of the facts.

Board Action: Report approved.

ENGINEERING PRACTICES

The Engineering Practices Committee feels that in order to adequately provide for the formation of Functional Groups on the national level, the NSPE Constitution and Bylaws should be modified to permit the following:

1. The organization of Functional Groups, with broad powers to act in their particular sphere of interest provided their activities are not in conflict with the expressed policies of NSPE.
2. The authorization for and creation of Functional Groups upon:
   a. Request of the NSPE Board of Directors.
   b. Request of one or more State Societies.
   c. Written request of 25 or more Members-at-Large.
3. Functional Groups to exercise sufficient latitude to set up self-governing units with rights to select their officers, levy dues, hold meetings, encourage the formation of state and local Functional Groups, etc. Each group shall be granted a charter from the NSPE Board of Directors. This charter shall clearly define the scope of activities of the Functional Group.
4. Functional Groups with the right to determine their membership requirements. Any NSPE member who meets the membership requirements may join *one* Functional Group.
5. Functional Groups to select one member to be an accredited, non-voting representative to the NSPE Board of Directors and the Executive Committee, who will be permitted to present and discuss the group's business under the normal rules of procedure.
6. Functional Groups to release statements which clearly comply with the adopted policies of NSPE. Statements and/or recommended policy releases of a Functional Group shall be released by the National Headquarters so that NSPE will be fully informed of the actions of the Functional Groups and can implement these policies.
7. The Functional Group directly affected shall be consulted before the Board of Directors adopts any policy that is contrary to previously adopted policies of the Board and/or the Functional Groups involved.
8. The NSPE Board shall either adopt without modification, reject, or return to the Functional Group for editing, any recommended policy submitted by any Functional Group.
9. Require Functional Groups to hold at least one meeting a year to be held concurrently with the Annual Meeting of NSPE. Each Functional Group shall submit to NSPE any changes in its rules and regulations, as adopted, and shall also submit an Annual Report outlining the Group's activities for the past year including policies, financial statement, membership, officers, etc.
10. The dissolution by the NSPE Board of a Functional Group:
    a. Whenever a Functional Group requests that it be dissolved.
    b. Whenever a Functional Group fails to comply with the above requirements.

Board Action: Report received and referred to State Societies for comment and to Constitution and Bylaws Committee to study any changes that may be indicated in the Constitution and Bylaws.

ETHICAL PRACTICES

No Board action is required except acceptance of this report of progress. The committee recommends that Board members carry back to their states and chapters a request that those states and chapters send clippings regarding advertising of engineering services (other than professional cards) and free engineering services to the Washington office for reference to the committee; also that contacts with local telephone companies be continued on the state and chapter level toward recognition of Professional Engineers in the matter of listings in the classified pages of telephone directories.

Committee activities in this administrative year have been broken down into sections and assigned to individual members due to their scattered locations in the country. Individual items under consideration, with the assignment and activity, are given here for the Board's information:

(1) **Uniform Telephone Listings:** assigned to Messrs. B. H. Backlund and C. H. Durham of Omaha, Nebraska. Contact has been made with the American Telephone and Telegraph Company in New York, notifying them that NSPE is continuing to strive for proper recognition in the classified pages. A memorandum urging continuation of their activities in this matter, has recently been sent to state and chapter presidents.

(2) **Ethical Advertising:** assigned to Mr. Bruce Barber of Columbia, South Carolina. This project also includes the problem of advertising of free engineering services by material and equipment manufacturers, and a request directed to state and chapter presidents for submission of clippings indicating types of advertising has been mailed from the Washington office. When received, this material will be studied to determine types and trends that can be used as a guide in recommending an NSPE policy in the future.

(3) **Competitive Bidding:** assigned to Mr. E. M. Buckingham, of Oakland, California. Information is being gathered to cover the numerous aspects of this project with due consideration given to a recent code change by one of the technical societies.

(4) **Educational Program on Ethics:** assigned to Mr. John R. Snell, Head of the Civil Engineering Department at Michigan State University until January 1, 1956, and now presiding officer of J. R. Snell and Associates, Consulting Engineering Services. Mr. Snell was appointed to the Ethical Practices Committee by President Neff at the request of the Chairman, and has been assigned the responsibility for contacts which will result in the preparation of articles on ethics. Due to Mr. Snell's past activities of a similar nature, it is the committee's hope that they can arrange outstanding articles for publication in national magazines that will dramatically point out the importance of ethics in the profession of engineering to the general public and to our fellow engineers.

(5) **Preparation for Future Release of a Brochure on "Professional Ethics for Engineers."** The Chairman is undertaking this assignment and is now collecting reference material on canons, codes, and the philosophy of ethics. Correspondence with the AIEE Committee on Ethics and the New York State Society of Professional Engineers has indicated that a need exists for such a publication that may be distributed to engineers and graduating engineering students of our universities and colleges. . . .

Board Action: Report Received.

INTERPROFESSIONAL RELATIONS

The four Standard Forms of Agreement Between Architect and Engineer and Between Engineer and Architect which were approved by the NSPE Board of Directors last October have since been approved by the Board of Directors of the American Institute of Architects.

(*Continued on page 33*)

N. E. Region Extends Invitation to May Meet

Representatives of nine Northeastern Region state societies convened in Trenton, N. J., recently to promote attendance for the 1956 NSPE meeting at Atlantic City. Seated, l. to r., are General Chairman G. N. Dign; New Jersey President M. S. Adams; Attendance Chairman W. E. Russell. First row standing, l. to r., are A. B. Onderdonk, President, Conn.; J. T. West, Jr., Pennsylvania; J. F. Way, President, Mass.; J. H. Powers, D. C.; F. L. Martin, President, D. C.; C. J. Dodge, New Jersey. Back row standing, l. to r., are George Baer, New York; J. H. Hallett, Jr., Del.; H. F. Roemmele, President, New York; P. W. Genovese, Conn.; C. P. Smith, Ohio and Md.

An unusual opportunity to attend the annual meeting of the National Society of Professional Engineers and at the same time to visit the world renowned Atlantic City recreation resort will be afforded NSPE members in May of this year. This will be the occasion of the 22nd Annual Meeting of our National Society scheduled for May 24, 25 and 26 at the Hotel Ambassador, Atlantic City, N. J. On that occasion our national officers for 1956 and 1957 will be formally installed.

It is not often that Society members have an opportunity to attend an event combining professional interests, sociability and recreation in such a superior program as is planned for the Atlantic City convention. The highlight from a professional interest standpoint will be a series of conferences to be held all day Friday relating to the problems of engineers in industry, engineers in government, engineers in private practice, and engineers in education. During the other days, all members will be welcome to visit the sessions of the Board of Directors of the National Society.

The social and recreational program will culminate with a dinner-dance on Saturday evening, May 26, at which the national engineering award will be presented. There are many other events with special attention being given to the ladies' program. Arrangements have been made to visit the beautiful new plant at which the famous Lenox china is made and also a world renowned orchid farm. Of course, swimming will be available and the famous Atlantic City boardwalk with its picturesque rolling chairs is always an attraction.

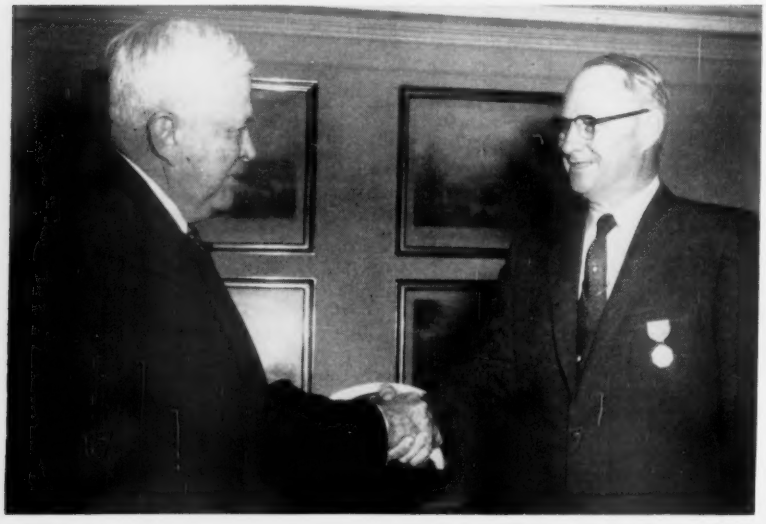
This is Leap Year—What an opportunity for engineers' wives to propose a vacation. So, why not leap at this chance to attend a national meeting. It really is not difficult because our modern parkways, throughways and turnpikes have brought Atlantic City within a few hours travel from your home.—*End.*

ENGINEERS' WEEK CHAIRMEN

There is still time to send your Engineers' Week story to the *American Engineer* for the big April story!

As usual, space will be limited but we will give as wide coverage as possible. So get the news of the Week's outstanding events in the mail.

Defense Dept. Award To E. N. Dingley



The Distinguished Service Award of the Department of Defense, which is given to only five persons in any one year, has been presented to Edward Nelson Dingley, Jr., at right in photo, an engineer with the National Security Agency and a member of the District of Columbia SPE and NSPE.

Mr. Dingley, who lives in Arlington, Virginia, received the award from Secretary of Defense Charles E. Wilson in a special ceremony at the Pentagon on January 18. The medal was bestowed "in recognition of ingenious solutions which he has developed to complex communications problems of the National Security Agency."

N.S.P.E. Believes

OUTSIDE PRACTICE BY GOVERNMENT ENGINEERS

BY PAUL H. ROBBINS, P.E.

Executive Director

N.S.P.E.

THE question of professional policy with respect to the performance of engineering services by engineers employed by government is one that has been before professional societies for some period of time. The Canons of Ethics have several sections bearing on this important item. These sections are used as a basis, in many cases, for justifying or condemning the practice.

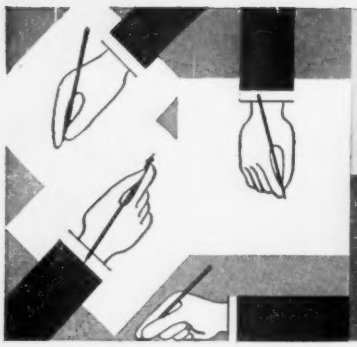
The Engineer in Government Subcommittee of the Employment Practices Committee of NSPE felt this question was of sufficient importance that a study should be made of prevailing practices in the Federal Government. Obviously, before any policy on this important question could be established it was imperative that a summary of any existing regulations be made. Accordingly, a query was addressed to the major agencies of the Federal Government employing engineers, requesting their comments and any written policies or directives which may have been issued pertaining to the subject. The cooperation of the Federal agencies was indeed most encouraging, and the committee presented an excellent summary of the results of this request to the February 1956 meeting of the Society. The subsequent adoption by the Board of Directors of the recommendations of the committee thus has established NSPE's policy in this important area.

It is interesting to observe that most agencies of government feel there is advantage to the government to have engineers broaden their experience by work in addition to that to which they may be assigned. While there is variation in the regulations under which such work may be performed, basically they conform to high ethical standards and require the engineer to perform these services in such a way as to bring no embarrassment upon the agency, not to conflict with his primary duties with the government, and to in no way utilize information which may be available to him through his governmental work. Within these limitations, NSPE believes "Professional Engineers in the employ of the Federal Government should be permitted to engage in outside professional practice on an individual voluntary basis, within the limitation of applicable law, regulations, and ethical standards."

NSPE has long taken the position that the Federal Government is entitled to the best in engineering services. It further recognizes there are functions of government which can best be performed by professional engineers in the employ of the Federal Government. Both the government and the profession benefit if these engineers have an opportunity to broaden their experience and to bring to their jobs some of the improved practices which may be available from non-governmental activity. By the same token, however, NSPE recognizes that such engineers should adhere strictly to the Canons of Ethics; particularly those sections dealing with the admonition that "He will not use the advantages of a salaried position to compete unfairly with another engineer."

It is again evident that the professional status of engineering is dependent upon the personal integrity of each of the professional engineers who go to make up the engineering profession. The engineer in government who does not adhere to the highest ethical standards hurts not only himself, but the engineering profession as a whole. Likewise, engineers in private practice or industry who entice engineers in government to betray their trust or to use their governmental position to provide engineering services at lower standards or fees than commonly accepted in the profession, do an irreparable harm to the government service, as well as to the profession as a whole.

NSPE believes that the wise and judicious application not only of the Canons of Ethics, but of the general principles laid down by the Federal agencies, will permit better engineering service for government and for the public at large.—***End.***



Professional POSTSCRIPTS

The Baltimore *Sun* recently carried a story on patent "getting" that our correspondents in that historical city felt might be of interest to our professional engineer readers. So, this month we start off —PP— with this cleverly written feature courtesy the *Sun*.

—PP—

A WELL dressed man of middle age came into my office the other day and said:

"My name is Jones. Although I'm in the shoe business and have my own store, my hobby is tinkering with electronic apparatus. I have just invented a radar alarm to prevent rear-end collisions between automobiles. It will light a lamp and ring a bell on the instrument panel when a car is too close to the rear of another. Speed and distance will be automatically measured by the radar and the alarm will be given when the distance between cars is too short to be safe for the speed at which they are moving. Can you tell me how to go about having it patented so I can sell or license it to an automobile manufacturer?"

"Well, first of all, Mr. Jones, you should make a sketch of the device and write a description of it," I replied. "Then sign and date both papers. Show the documents to a friend and have him sign and date them as a witness. You might also have the papers notarized. This will give preliminary proof of the date of your invention.

"Now, before telling you the next step in the procedure, let me ask you if at present you are leading a reasonably happy life. If so, and if you want your happiness to continue, take the papers and throw them into the waste-basket. Forget the brainstorm entirely."

"IF getting the invention patented is a question of money," said Mr. Jones, "I have put some aside to spend on the project."

"It is not so much a question of money as it is a matter of your being able to weather disappointment and discouragement," I explained. "I've been through it all. I have over 50 patents of my own. Some of them have been successful and are widely used. Some have failed.

"A successful invention must first be new, patentable and in a field in which the inventor is thoroughly familiar. Second, it must be timely. Third, it must have sales appeal. And fourth, its cost must be comparable to the service the device renders.

"Back in 1914, Mr. Jones, I patented a power brake for automobiles. No one was interested in it. Now, 40 years later, with the advent of power windows, power seats and power steering, public acceptance of power brakes comes naturally. But in the dim past, when I invented a power brake the device had no sales appeal. It was too far ahead of its time.

"Do you remember the old Rauch & Lang electric auto? It was a beautiful car. But it was too expensive to run because the batteries had to be charged daily. Now, with the discovery by the Radio Corporation of America of nuclear batteries, the automobile of the future may again be powered by electricity."

"Yes, you are right," Jones agreed. "I recall that even Edison had trouble marketing his incandescent lamp because of the high cost and power loss inherent in his direct current electrical system. It wasn't until Westinghouse developed the alternating current method of power distribution that the incandescent lamp came into general use."

"But before you can do anything with an invention you must obtain adequate patent coverage," I continued. "And this is a tedious procedure even if the device is patentable. You send your drawings and description to a patent attorney and he makes a search to see if your apparatus is new. In view of the fact that one sixth of all patents are related to automobiles your attorney will probably find that your invention has already been patented. If so, you are fortunate. It would be your only disappointment. Financially, you would only be out $50 to $75, the lawyer's fee for making the search. The shock would not be to your pocketbook but to your pride."

"Yes, that would hurt," Mr. Jones admitted.

"ON the other hand," I continued, "suppose the prior art found in the patent search does not anticipate your invention. Your patent attorney goes ahead and prepares and files an application for a patent. Then you wait. You wait from eight months to a year before your case is reached by the understaffed examining department of the United States Patent Office. Your application is reached. It is rejected. Your lawyer studies the prior patents cited by the examiner and amends your claims. Six months pass before the amendment is acted on. This time maybe one claim is allowed. The others are rejected. Your attorney again argues with the examiner, makes further concessions, and gets the case allowed and passed to issue."

Mr. Jones asked: "In addition to all of the time wasted, doesn't the legal work cost a lot of money?"

"A patent costs from about $300 to $500, depending on the amount of work involved," I explained. "This includes the Government filing fee of $30, the Government final fee of $30, the cost of the drawings, and your patent attorney's fees. All of these costs are usually included in itemized form in your lawyer's bill.

"So, Mr. Jones, you now have a patent on your invention. You are up in the clouds. You obtain copies of your patent and send one after another to each of the auto makers. Your patents come back, one after another, 'Sorry, but we are not interested, thank you. . . .' You are down in the dumps, disappointed and discouraged. You may even have developed ulcers."

There was silence for a moment after I had stopped talking. Then my visitor said rather sadly, "Mr. Adler, you paint a discouraging picture of the situation. Why wouldn't the automobile people be interested in my invention? It certainly is timely."

"Yes, it is timely," I agreed. "But

it has no sales appeal. No motorist would want to have your alarm bell ringing in his ear or the signal light flashing in his eyes whenever he gets too close to the car ahead. This would annoy him and he might disconnect the apparatus. And for a manufacturer to install radar equipment, no matter how small, in every car, this would be entirely too costly.

"AUTO makers are being deluged continuously with thousands of ideas and inventions from outsiders like yourself who know nothing of the specialized problems, costs, and plans of auto building. The car builders have their own staffs of research engineers and inventors whose full-time job it is to know the product thoroughly, study it constantly for means of improvement, learn the customers' demands, and the trends of the immediate future. Yes, I'll admit, once in a while an outsider's patent is accepted. But this doesn't happen very often. It is a rare occurrence."

Jones reached for his hat. "You know," he said, "I believe there is something in what you have said. I have a little shoe factory near Boston that makes some of the shoes we sell in the store. Now I know the shoe business from top to bottom: lived with it all my life. Do you know what I'm going to do?" His eyes sparkled and he smiled. "I am going to forget automobile gadgets and devote my efforts toward inventing, designing and patenting new styles in shoes and better methods for making them. My own factory can manufacture my ideas and my own store can sell them." He put on his hat and stood up. "I'm going to follow the proverb which says 'Shoemaker, stick to your last.'"

We shook hands.

—PP—

Engineer W. R. Clarke of Tulsa, Oklahoma, is ready to fly in the face of pretty strong opinion and believes that "There Is a Surplus of Engineers." Indeed, that is the name of the piece he has sent along to us and we are pleased to reprint it below. Any comments?

—PP—

A few months ago, when the President of the United States was removed temporarily from the functions of the government, there was speculation as to whether adequate administration could be accomplished by the President's assistants. This situation caused us to reflect on the organizations within our own industry. Are we sufficiently diffusing the responsibility and authority of administration within our companies? Here, the need is not just for insurance against the removal of key personnel but to train employes to be more productive—to teach them that their job is more than the routine accumulation, computation, and tabulation of data.

The diffusion of responsibility is not easily achieved. The two sides to this problem are based on divergent attitudes so that it is necessary to reconcile two philosophies. To examine a particular instance where it is believed that a greater diffusion of responsibility would be helpful, let us consider the reported shortage of engineers. First let us consider management's evaluation of this particular situation. Then we will try to understand the engineer's appraisal of the same matter.

A shortage in the quality of engineers was reported in a recent survey made by the National Science Foundation. The Foundation's Scientific Manpower Bulletin No. 6 entitled, "Shortage of Scientists and Engineers in Industrial Research," has been quoted many times to emphasize a shortage of engineers. However, one of the foundation's main summaries was that half of the firms made no point of numerical shortage. These firms stated that the expansion of research and development programs are being hindered by the inability to find people with the kind and quality of training needed.

Yet a feeling of despair exists among some of the engineer employes. They state during their professional society meetings and in their articles for business papers that they have little time to show their real abilities as engineers. They contend that most of their time is taken with routine duties which leave little or no time for making proper use of the data that is accumulated and tabulated. They want to express themselves as a profession and yet their day-to-day duties seem to require that they be only technicians. There appears to be little opportunity to demonstrate their ability to solve industrial problems by the analytical processes they have learned from a formal education.

How can these two analyses of the same situation coexist? How can management say that engineers lack ability to assume responsibility while the engineers say that they are not given the opportunity to demonstrate their abilities? We believe this arises from the natural tendencies of each group. Just as it is difficult for top management to let the man of less experience and ability make decisions, it is difficult for the engineer to appreciate the value of a prompt decision as opposed to an accurate understanding. It may be that the engineers, who work doggedly on and on to accumulate more and more data before making a recommendation to management, have the same feeling that causes responsibility and authority to be concentrated in top management—fear of failure.

The results of a greater diffusion

Nebraska Society of Professional Engineers — Annual Meeting, March 17, 1956, Omaha, Nebraska.

Ohio Society of Professional Engineers — Annual Meeting, March 22, 23, 1956, Biltmore Hotel, Dayton, Ohio.

NSPE State Presidents' Conference—March 23-24, 1956, Biltmore Hotel, Dayton, Ohio.

Illinois Society of Professional Engineers — Annual Meeting, April 12-14, 1956, Morrane Hotel, Highland Park, Ill.

Florida Engineering Society—Annual Meeting, April 25-28, 1956, Pennsylvania Hotel, West Palm Beach, Florida.

Indiana Society of Professional Engineers — Annual Meeting, April 27-28, 1956, Van Orman Hotel, Ft. Wayne, Ind.

Pennsylvania Society of Professional Engineers—Annual Meeting, May 11-12, 1956, Yorktowne Hotel, York, Pa.

Maryland Society of Professional Engineers—Annual Meeting, May 15, 1956, Park Plaza Hotel, Baltimore, Maryland.

New York State Society of Professional Engineers—Annual Meeting, May 17-19, 1956, Statler Hotel, New York, N. Y.

Massachusetts Society of Professional Engineers — Annual Meeting, May 19, 1956, Boston, Mass.

New Jersey Society of Professional Engineers—Annual Meeting, May 24-26, 1956, Ambassador Hotel, Atlantic City, N. J.

NSPE Annual Meeting — May 24-26, 1956, Ambassador Hotel, Atlantic City, N. J.

District of Columbia Society of Professional Engineers — Annual Meeting, May 29, 1956, Cosmos Club, Washington, D. C.

California Society of Professional Engineers—Annual Meeting, May 31-June 2, 1956, Modesto, Calif.

NSPE Fall Meeting — October 25-26, 1956, The Greenbrier, White Sulphur Springs, W. Va.

of responsibility may include a few more stumbles, but the over-all gain in efficiency should outweigh these disadvantages. Management may unburden itself of the many subordinate decisions that are required from day to day in order to carry out basic company policies. The decisions may be handled by the employes who are familiar with the information required for making them. This will give the employe a better understanding of the many factors which must be considered in order to resolve ideas, research, and operations into tangible assets. He will begin to see that detailed work must be justified in the light of the over-all goal of a given project. The engineer, who is schooled in methods of analytical and abstract thinking, will begin to grasp some of the intangible aspects of management policies.

Communication is the key to a workable solution. When one goes to a medical doctor for an examination, they are in effect saying, "Doc, what do you think of the situation I'm in?" It is expected that the doctor, in the light of his knowledge and experience, will analyze the situation and recommend treatment.

When an engineer is hired by an organization, they are saying, "Sir, what do you think of the situation here?" Management has the duty to emphasize that the employe is expected to widen his experience and seek more authority. The efforts that engineers devote to acquiring more responsibility will decide whether they rise in professional stature or fall into routine.

Many engineers get into the profession because they derive a great deal of satisfaction from understanding physical and chemical phenomena. Later, they may consider their work consists of routine functions from which they derive little benefit or development. It is then that they may realize that they have spent too much time asking themselves *how* to do a calculation or apply a principle and too little time asking *why* perform the calculation or apply the principle.

—PP—

Popular NSPE Past President L. L. Dresser of Tulsa, Oklahoma, has forwarded to us a short article from the magazine *Petroleum Refiner*. He writes about the story: ". . . it has particular reference to engineers and management. I thought you would be interested in this comment from a petroleum magazine." We *are* interested and think our readers will be, too. Here it is . . .

There have been few articles written recently that do not cry out about our critical shortage of engineers. "Compare our graduation score with Russia," they say! True, Russia must be producing more engineers now, but it's not difficult to look around us here at home in different industries and see many engineers working not fully on engineering, and indeed, frequently not in engineering at all. Why then is there a shortage?

Could we, industry and our national government, absorb all our engineers if they were working strictly on engineering work that could not be handled by less technical persons? Yes, we must continue to persuade the grade and high school boys and girls to follow engineering in future courses in college. In fact, we must encourage our teachers to fully inform their students of the requirements for proper entrance into college engineering.

My personal observation indicates, however, that even with all the promotional work to sell the youngsters on engineering, there are less than enough entering our engineering colleges to meet the demands for graduates. Why do we need so many? It is not difficult to understand why:—it is because employers hiring engineers realize there are few graduates trained in non-engineering courses as well rounded to handle nearly any problem they may encounter even though remote from engineering. . . .

Frequently you hear appeals to hire the handicapped. I am in favor of this; however, they are far from being handicapped if they are placed where their efforts can best be utilized even though they may be restricted from certain other work due to a lack of various facilities. Now, let's compare the engineer. He has full use of his facilities, he can work at nearly any clerical or labor job efficiently, but generally he is handicapped if he is kept there too long. In fact, on this basis, one might consider him permanently handicapped if there were no engineering future for him.

It would be foolish to hint that engineers going into management are misplaced. Actually the reverse is true for in that position they have demonstrated exceptional managerial qualities, but not always because they have proved themselves as engineers. Rather they have again proved their ability to accept a great many diversified responsibilities and with continued success.

What shall be done? Make a drive to warn graduates not to go into positions that are not strictly engineering? No, for the demand is too great. Concentrate on engineering colleges to teach more technical subjects? No, that would limit the engineers to specific specialties! Let's concentrate on putting engineers at work where those less trained are "handicapped." Let the "handicapped" handle the work within their scope and release the engineer to do more important work.

If this could be done immediately, I'd say we'd have a surplus of engineers and a great demand for replacements in their present positions. We all realize this cannot be done overnight, and, in fact, it is doubtful if it can ever be done unless engineers concentrate on this important problem together.

To let it stand as it is opens the door to labor unions to sign up engineers as laborers and not professional men.

—PP—

MARCH MEETINGS Of Note

Department of Civil Engineering, University of Illinois—Annual Illinois Traffic Engineering Conference, March 1-2, University of Illinois, Urbana, Ill.

American Society of Mechanical Engineers—Aviation Division Conference, March 14-16, Beverly-Hilton Hotel, Los Angeles, Calif.

American Society of Tool Engineers—National Convention and Industrial Exposition, March 19-23, International Amphitheatre, Chicago, Ill.

Illinois Institute of Technology and Cooperating Schools and Societies—American Power Conference, March 21-23, Hotel Sherman, Chicago, Ill.

NSPE Study Of Committee Structure Set

A special NSPE committee on Committee Structure Study has been appointed by President Allison C. Neff, according to a Society headquarters announcement.

Clarence T. Shoch of Allentown, Pennsylvania, has been named chairman of the new committee. Other members are: T. Carr Forrest, Jr., Dallas, Texas; John D. Coleman, Dayton, Ohio; L. L. Dresser, Tulsa, Oklahoma; and S. L. Stolte, St. Paul, Minnesota. The chairman and committee members are all past presidents of NSPE.

The Committee held its organization meeting during the recent Board meeting in Washington, D. C. The group reviewed in detail the functions and aims of the National Society as outlined in the Constitution and By-laws. Further discussions will be held to determine whether or not the present committee setup is adequate to accomplish the goals established.

Meeting

(*Continued from page 27*)

After review by legal counsel these documents are to be printed by the facilities of AIA with proper recognition to NSPE and available to NSPE members at cost. This method was agreed upon for reasons of economy and uniformity in the documents.

To date no action has been taken by the AIA Board of Directors on the Interprofessional Code of Practice for Architects and Engineers. In our opinion, this document is closely related to the Standard Forms of Agreement as it contains the ethical standards for the relationship of the two professions which guide their action over and above the legal tenets of the Standard Agreement. As such, it should be distributed with the Standard Agreements.

Our committee members have been utilizing their friendly relationships with individual architects in an effort to have them encourage the AIA Board to act favorably on the Interprofessional Code. As this Board has approved this Code, the committee also wishes to enlist your aid by requesting that you discuss the matter with your many architect friends and have them exert their influence to secure AIA Board approval.

Board Action: Report Received.

MEMBERSHIP

General

The activities of the Membership Committee have been in a role of principally reviewing material being prepared by the Washington office staff and making appropriate comments. The staff is to be highly commended for the leadership it has displayed in developing new material for membership campaign activities and otherwise promoting the growth of the Society. The NSPE publication "Every Man a Debtor" and other related literature such as "NSPE activities of particular importance to the consulting engineer," are accomplishments that strengthen the Society and encourage increased membership.

1955 Growth

During the 1955 calendar year, NSPE's membership increased by 2,296 new members or 6.7%. Of the 2,296 new members, 2,242 are full members and 54 are engineers in training. NSPE membership now represents 18% of all licensed engineers within the United States. The Society, therefore, has a fertile field in which to expand.

Illinois-Missouri Contest

The following program has been reviewed by all members of the Committee. It recommends that this program be approved and authorized for initiation at the earliest possible date following Engineers' Week.

A Proposed Membership Program of the NSPE Membership Committee

Considerable thought has been given to ways and means of reaching prospective members and informing them of the valuable contributions and work of NSPE to the engineering profession. As we all know, a personal visit to each prospect is physically impossible; therefore, our next best plan of action is a mailing to each prospect. Experience has demonstrated that in order to get the story across it is best to initiate a series of mailings—possibly three or four. To accomplish this requires that addressograph plates be cut on each prospect and a well-planned series of membership pieces be sent. Few states and chapters have adequate facilities to do this, and the following program has been developed with that thought in mind. Therefore, this committee proposes that we set in motion a program based upon the NSPE Membership Committee providing the impetus to get new members into NSPE.

The Membership Committee recommends that six (6) *representative* states be selected as a starting point. Should the program prove to be effective, it could be enlarged to embrace others, but as an initial start, it is felt that six states would give this committee an idea of its effectiveness. This number is suggested as one state could be taken from each of the geographical areas: (1) Northeastern area: *Connecticut*, Delaware, District of Columbia, Massachusetts, Maryland, New Jersey, New York, Pennsylvania, Rhode Island; (2) Southeastern area: *Alabama*, Florida, Georgia, North Carolina, Puerto Rico, South Carolina, Tennessee, Virginia; (3) Central area: Illinois, *Indiana*, Michigan, Ohio, West Virginia, Wisconsin; (4) North Central area: Minnesota, Missouri, Kansas, *Nebraska*, North Dakota; (5) Southwestern area: Arkansas, *Colorado*, New Mexico, Oklahoma, Texas; (6) Western area: *Arizona*, California, Idaho, Nevada, Utah, Washington. The states italicized have a current directory available.

Two controlling factors in the selection of a state in each of the geographical areas would be: (1) Do they have a current list of registered professional engineers (preferably 1955) available; and (2) Would the State Society cooperate in this program? It should be emphasized that the State Society is the crucial link in this program and without its wholehearted cooperation the program would bog down.

After the states have been selected, the next step would be to check the roster against the NSPE membership in that state, eliminating those who are NSPE members, as well as non-residents, and cut addressograph plates for each of those remaining. It seems advisable to cut plates to carry out the three-or-four-time mailing, for to type each envelope three times would be unduly expensive.

This committee feels that we should obtain application forms from the State Society being solicited and include one in each mailing. This application would be returned to NSPE Headquarters and in turn would be forwarded to the appropriate State Society for follow-up. It is further recommended that acknowledgment letters be prepared by Headquarters.

Board Action: Report approved.

NATIONAL AFFAIRS

Following instructions from the Board under Action 55-156 ratifying the Executive Committee recommendation E55-84, this committee has proceeded with the compilation of professional policies of NSPE.

The committee has interpreted the Board's instructions ". . . referred to the National Affairs Committee for review and recommendation of further steps . . ." to mean that the committee was to go over all matters of policy as published, recommending review, abandonment, elaboration, clarification, or any other recommendations which it might have.

Accordingly, the committee met in Washington on November 25 and 26, reviewed the August 1st, 1955, draft and is offering it to the Board for its consideration and adoption.

The committee has attempted to combine certain actions, has modernized other actions and has omitted certain other actions for reason of obsolescence. All actions up to and including those acted on at the Philadelphia meeting have been reviewed and are included herewith.

Board Action: Report and policy statements approved.

PUBLIC RELATIONS
A—General Public Relations Activities

1. *Instruction in Mathematics and Sciences in High Schools*
   Advice from educators indicates the need for careful planning in any approach to secondary school administrators with proposals to introduce improved teaching of mathematics and sciences for gifted students. In educational circles, grouping students according to scholastic ability is a highly controversial issue. In order to avoid the many pitfalls in the way of our members who will bring up the subject in their home communities, the Committee applied for a foundation grant of $7,500 to prepare and print two pieces of literature. These would be prepared by the staff of Columbia Teachers' College, which is widely recognized as one of the leading and authoritative educational institutions in the country.
   a. The first is a pamphlet of eight to ten pages, "How to Work with Your Schools," intended to serve as a guide to the members of our Society. It would outline methods of effective approach in presenting the material to boards of education, school administrators, parent-teacher associations and to the general public.
   b. The second is a brochure of forty to fifty pages on "Providing an Appropriate Program of Education for Superior Students in Mathematics and Science," intended for distribution to school administrators and teachers. It would contain technical descriptions of methods used successfully in several schools.

   We regret to report that our application for a grant was not successful. We will seek reconsideration of this application. Suggestions for sources of funds for this important project will be most welcome.
2. *Engineering Clubs in High Schools*
   The PR Committee is considering the matter of gathering information from a number of communities on local sentiment regarding the formation of engineering clubs in the high schools. Such information would be used to help formulate the position the National Society should take in connection with the promotion of such clubs through NSPE affiliates.
3. *Accreditation to the Department of Public Information of the United Nations*
   The Society has been accredited to this UN group, and the PR Committee Chairman has been appointed as official representative. In addition to several "briefings," your representative at-

(*Continued on page 36*)

SUBJECT LISTING OF NSPE PUBLICATIONS

(Unless otherwise indicated publications listed below are FREE and may be obtained by writing to the National Society of Professional Engineers, 2029 K Street, N. W., Washington 6, D. C.)

CHAPTER ACTIVITIES
Monographs outlining various Chapter functions have been prepared for the use of Chapters: **Helping the Young Engineer, Ladies Auxiliaries, Promote Ethical Practice, Chapter Publications, Functional Group Activities** and **Meetings, Fellowship** and **Attendance.**
Welcome Mr. President—An informative booklet outlining organizational functions and suggestions for Chapter Presidents.

COMMUNICATIONS
How to Improve Engineering-Management Communications — Executive Research Survey Number One. Based on a survey of more than 300 companies employing engineers, this report contains information on engineering-management relations with respect to the lines of communication between engineers and management. Price $1.00 (members).

COMPETITIVE BIDDING
About Competitive Bidding—Reprint from American Engineer (NSPE Believes).
Competitive Bidding for Professional Services—Statement of Policy by NSPE.

CONSULTING ENGINEERS
So You Want to Open A Consulting Office—Series of articles dealing with problems faced in opening a consulting office: By way of qualifications—John B. McGaughy, P. E., Operating Your Practice—Alfred J. Ryan, P. E., Ethical Problems—Francis S. Friel, P. E., Reprints from American Engineer. 20¢ each article—3 for 50¢.

CONTRACTS
Recommended Procedure for Negotiating Engineering Contracts — Statement of Policy by NSPE.
(See Standard Form of Agreement)

CORPORATE ENGINEERING PRACTICE
Corporate Professional Practice vs. Individual Professional Practice — The Special Committee on Registration Law, NYSSPE. Reprint from American Engineer.
Should Corporations Practice Engineering?—Ronald B. Smith, P. E. and V. George Terenzio, P. E. Reprint from American Engineer. A discussion of the pros and cons of the issues involved in the debate over corporate practice of engineering.

CREED
Engineers' Creed—Suitable for distribution—free; for framing—50¢ each.

EDUCATION
Educating the 1950 Model Engineer—Dean S. C. Hollister. The author discusses the philosophy of engineering education. Reprint from American Engineer.
Needed: A Sure Sense of Values—Bernard Baruch. Discussion of technological advancements. Reprint from American Engineer.

ENGINEERING CONTRACTS
See CONTRACTS

ENGINEERS
There's Nothing Wrong with Engineers—Dr. Jose B. Calva, P. E. Refutation of the belief that engineers possess a strong inferiority complex. Reprint from American Engineer.

ENGINEERS' CREED
See CREED

ETHICS
See COMPETITIVE BIDDING
Canons of Ethics—Suitable for distribution—free; for framing—50¢ each.
Ethics and the Professional—Dean N. W. Dougherty, P. E. A study in human conduct. Reprint from American Engineer.

FEE SCHEDULES
Recommended Grades, Duties, Responsibilities and Qualifications for Pre-Professional and Professional Positions—Adopted by NSPE June, 1952.
Report on Fee Schedules—Revised October, 1954. A study of the Salary and Fee Schedule Committee of NSPE bringing together various schedules of fees and related practices of engineers in the consulting field.

FUTURE OF ENGINEERS
An Engineer's Report on the Future—Charles F. Kettering. The author tells how the engineering profession promises a better and more abundant life in the future. Reprint from American Engineer.
Engineers For the Future—Reprint from American Engineer (NSPE Believes).

GOVERNMENT
Engineers in Federal Government—Reprint from American Engineer (NSPE Believes).
NSPE Senate Testimony Treats Federal Salaries — Testimony presented before the Senate Committee on Post Office and Civil Service—Executive Director, Paul H. Robbins.
Our Function in Governmental Liaison—Reprint from American Engineer (NSPE Believes).
Engineers in the Federal Government—Reprint from American Engineer (NSPE Believes).

INDUSTRIAL RELATIONS
A Professional Look at the Engineer in Industry — NSPE Engineer-in-Industry Committee. A major publication of vital importance delving into all phases of the professional and economic status of that group which comprises the largest number of engineers in any functional field. Price $1.50 (members).
Collective Bargaining by Professional Employees—Statement of Policy by NSPE.
Professionalism or Unionism—Facing the Issue—Past President T. Carr Forrest, Jr., P. E. A discourse on the aspects of unionism for the professional. Reprint from American Engineer.
The Professional Engineer in Industry—Reprint from American Engineer. (NSPE Believes).
The Professional Union—A Contradiction—Past President Clarence T. Shoch, P. E. A discussion of the development of engineers' unions and the reasons why unionism is incompatible with professionalism.

LABOR RELATIONS
See INDUSTRIAL RELATIONS

LEGISLATION
A Professional Look at the Engineer in Industry — (See INDUSTRIAL RELATIONS).
Legislative Bulletin—Published monthly by NSPE; available to members upon request.

MANPOWER
How to Attract and Hold Engineering Talent — Executive Research Survey Number Three. This report reflects the experience of more than 200 companies which employ engineers and attitudes of 1,400 individual engineers who are employed in industry. Price $1.00 (members).
How to Improve the Utilization of Engineering Manpower—Executive Research Survey Number Two. This report pools the experience of more than 495 companies employing engineers on the subject of utilization of manpower. Price $1.00 (members).

MEMBERSHIP PROMOTION
Every Man a Debtor—Sixteen-page booklet explaining NSPE organization, programs, activities and objectives.
Membership Kit—This kit is available to Membership Chairmen and contains a general outline of membership campaign techniques and sample materials. Any of the publications listed in this outline are generally available for distribution to membership promoters as membership mailing pieces.

NSPE PHILOSOPHY
Engineering Societies of America—Paul H. Robbins, P. E., Executive Director, NSPE. Describes organization, programs, activities and objectives of NSPE. Reprinted from G-E Review.
Every Man a Debtor — (See MEMBERSHIP PROMOTION).
Is Our Registration Requirement Limiting Membership?—Reprint from American Engineer (NSPE Believes).
Why a Professional Society? — Reprint from American Engineer (NSPE Believes).

NATIONAL SECURITY
Report of Special Committee on Engineering Manpower—Special report to NSPE Board of Directors, Spring Meeting, Charlotte, North Carolina.
The Engineering Profession in National Security — The total welfare and security of the United States and not the best interests of any group or of any individual is the basic consideration for all questions to be resolved in this policy statement of the NSPE.

NATURAL RESOURCES
Development of Natural Resources—Statement of Policy by NSPE.

ORGANIZATION
A Model Law for the Registration of Professional Engineers and Land Surveyors.
Model Constitution for Ladies Auxiliary Chapters.
Model State Society Constitution.
NSPE's Constitution and Bylaws.

PROFESSIONAL DEVELOPMENT
Professional Development—The Responsibility of Industry and the Engineer—Conference Proceedings of 1955 meeting devoted to a discussion of the engineer in industry.
The following three separate pamphlets are based on remarks of the 19th Annual Meeting:
NSPE's Development of Professional Objectives—Perry Ford, P. E.
The Need for More Effective Professional Action—Alex Van Praag, Jr., P. E.
The Place of Registration in Professional Development — Karl B. McEachron, P. E.
Professionalism in Industry: The Dow Story—Case history of professionalism in industry. Reprint from American Engineer.

PROFESSIONALISM
How a Professional Attitude Can Be Instilled In Engineers—Dean W. R. Woolrich, P. E. Reprint from American Engineer.
Professionalism or Unionism—Facing the Issue — (See INDUSTRIAL RELATIONS).
Some Thoughts on Engineers and the Engineering Profession—Speech by Harry A. Winne, P. E., Vice President, General Electric (Retired), presented at the 20th Annual Meeting of NSPE.
The Professional Union—A Contradiction —(See INDUSTRIAL RELATIONS).

PUBLIC RELATIONS
Engineers' Week—Reprint from American Engineer (NSPE Believes).
Engineers' Week—Printed report of the 1955 observance.
Our Public Relations Responsibilities—Reprint from American Engineer (NSPE Believes).
The National Engineers' Week Story—Review of nation-wide activities of Engineers' Week for 1955.

REGISTRATION
Is Our Registration Requirement Limiting Membership?—Reprint from American Engineer (NSPE Believes).
Next Step Registration — Informative pamphlet for engineering students and others on values and procedure for engineering registration.
Registration: Then, Now and Tomorrow —Frank H. Prouty, P. E., Chairman, National Bureau of Engineering Registration. Reprint from American Engineer.
The Place of Registration in Professional Development — (See PROFESSIONAL DEVELOPMENT).
Professional Engineering Registration Laws—A compendium compiled by Alfred L. McCawley in cooperation with NSPE. Available from A. L. McCawley, Box 474, Jefferson City, Missouri—$8.75.

SALARY AND FEE SCHEDULES
See FEE SCHEDULES

SALARY SURVEY
Digest of 1954 Salary Survey—Pamphlet highlighting the full report.
Professional Engineers' Income and Salary Survey — 1952 and 1954 statistics covering NSPE members — 50¢ each (members).

SOCIETY OPERATIONS
Annual Report of NSPE—Outlines in detail the functions and activities of the Society and gives a picture of its financial situation, with respect to income and expenses.

STANDARD FORM OF AGREEMENT
Standard Form of Agreement Between Owner and Engineer for Professional Services—Price—5¢ each.

TECHNOLOGY
The Case for Technology—Brig. General David Sarnoff. A factual answer to those who believe that the path of technology could lead to ruin. Reprint from American Engineer.

TRAINING
How to Train Engineers in Industry—Executive Research Survey Number Four. This report reflects the experience of more than 200 companies which employ engineers, as well as of many individual leaders in the training field. Price —$1.00 (members).

UNIONISM
See INDUSTRIAL RELATIONS

UNITY
Let's Take Warning From History—President A. C. Neff, P. E. Reprint from American Engineer.
Unity for Professional Action — Reprint from American Engineer (NSPE Believes).

VOCATIONAL GUIDANCE
Annotated Vocational Guidance Bibliography—Listing of current pamphlets and books of interest to counselors and prospective engineering students.
Do We Have Enough Engineers? Reprint from American Engineer (NSPE Believes).
Engineering . . . A Career of Opportunity—A general vocational guidance pamphlet.
Engineering . . . A Creative Profession Offering a Career of Opportunity—A general vocational guidance pamphlet for parents, teachers and counselors.
Engineering Horizons of Tomorrow—T. Carr Forrest, Jr., P. E. Reprint of a speech delivered at a High School Career Conference, University of Oklahoma.
Engineers For The Future—Reprint from American Engineer (NSPE Believes).
List of Accredited Engineering Schools—Reprint from ECPD Annual Report.

French Decorations For Steinman

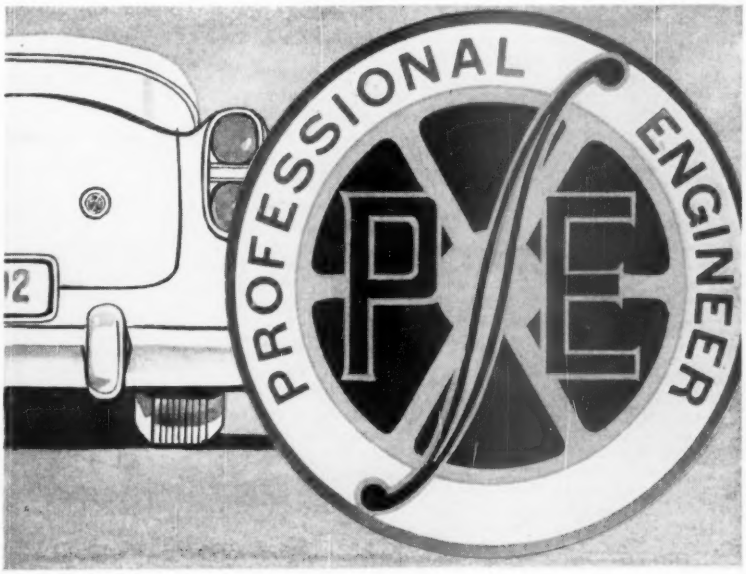
Dr. David B. Steinman, the well-known bridge builder, has been notified that he has been awarded two French decorations—the Cross of Commander of the Order of Merit and Education, and the Cross of High Officer of the Order of Merit for Research and Invention. The honors are being bestowed on Dr. Steinman, who was NSPE's first president, in recognition of his professional achievements and scientific contributions in the design and construction of long-span bridges.

Science Academy Chairmanship For N. V. Feodoroff

Nicholas V. Feodoroff, a member of the Bronx Chapter of the NYSSPE and associate professor of civil engineering at Manhattan College, has been re-elected to serve as chairman of the Section of Mathematics and Engineering of the New York Academy of Sciences for 1956.

Dean Wilson Speaks In Kansas City

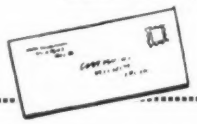
Dr. Curtis L. Wilson, dean of the Missouri School of Mines and Metallurgy in Rolla, was the guest speaker at a recent dinner meeting of the Western Chapter of the Missouri SPE in Kansas City. The title of Dean Wilson's address was *The Road to Survival.*



BE RECOGNIZED . . .

Display This New and Striking P. E. Emblem on Your AUTO

Here is a beautifully colored and practical auto medallion emblem which every professional engineer can display with pride. No bolts or brackets. An adhesive backing cements emblem to trunk lid or other metal surface. Just press on. Leaves no mark on paint when removed. The 3¼-inch emblem bends easily to fit curved paneling. Design finished in maroon, black, white, and chrome. A completely new emblem, it will afford professional recognition with dignity and attractiveness. ORDER YOURS NOW FOR ONLY $1.00.



MAIL THIS COUPON TODAY!

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
1121 Fifteenth St., N.W., Washington 5, D. C.

Please send me at once the 3¼-inch P.E. Emblem for my car. I enclose.....check.....money order for $1.00 to cover the cost of the emblem, handling and mailing charges. Send to:

(Name) .....

(Address) .....

(City) .....(State) .....

I am registered in (name of state).....

Meeting

(*Continued from page 33*)

tended the annual conference of the Non-Governmental Organization on December 12, 13, and 14. NSPE was welcomed as the only engineering group accredited at present.

B—National Engineers' Week

1. *Promotional Kits*
   National Engineers' Week Kits containing promotional material for local chapter use were mailed to all NSPE affiliates. Over 1,200 kits were distributed, and the National Society had requests for many more.
   This year a questionnaire will again be sent to all Engineers' Week Committee Chairmen soliciting their evaluation of the material in the kits.
2. *Promotional Aids*
   The PR Committee directed the preparation of the following promotional aids for use by industry and NSPE groups: A set of five 1-minute TV films; a set of seven TV slides; gummed seals containing the poster design; small cardboard posters; large paper posters; paper banners; newspaper mat stories on the engineering behind the space satellite, and on George Washington as an engineer; a fifteen-minute tape recorded program for radio on "Project Satellite—An Engineering Step to Outer Space;" and a metal logotype of the poster design.
   Order forms offering prices and descriptions of these aids were prepared for industry and Society use. Advertisements for the aids were prepared for the AMERICAN ENGINEER.
3. *Action Letters*
   A series of "Action Letters" were sent to all NSPE groups, starting in the early fall, for the purpose of stimulating interest in advance planning for local observance of the Week. The letters contained information on the use of promotional aids, and ideas concerning Engineers' Week programs.
4. *"The National Engineers' Week Story"*
   This 12-page, illustrated brochure telling the story of the 1955 National Engineers' Week observance was developed and prepared under the supervision of the PR Committee. Nearly 2,000 copies were distributed throughout the National Society, and to industrial firms. Many firms ordered quantities of the booklet for distribution to their engineering departments.
5. *President Eisenhower's Letter*
   The National Society was most fortunate to receive a letter from President Eisenhower addressed to President Allison C. Neff. The letter paid tribute to the profession on the occasion of National Engineers' Week. Reproductions of the letter were distributed throughout the Society, and a mailing was made to a selected list of approximately 550 industrial firms. Several thousand copies of the letter have been distributed.
6. *General Correspondence*
   The PR Committee directed an extensive correspondence on the events of, and philosophy behind, National Engineers' Week. Inquiries were answered from the Society membership, educators, industrial and engineering executives, and the newspaper and periodical press. A special mailing was made to the more than 2,000 members of the American Association of Advertising Agencies. This mailing resulted in many requests for promotional material on National Engineers' Week. Special mailings were also made to banks and insurance firms, to publishers of major newspapers and magazines, and to heads of major radio and television networks.

C—Public Information Activities

1. The staff has prepared and issued releases to the newspaper and periodical press on National Society policy; feature articles in the AMERICAN ENGINEER; the completion of the new headquarters building in Washington, D. C.; future National Society meetings; and speeches by President Neff.
2. *PR News Letter*
   The staff continued the preparation and distribution of the PR News Letter to the Society membership. A definite attempt was made to utilize this publication to bring to the chapter PR committees a number of ideas for public relations activities which had been actually used by some NSPE affiliate.

D—Public Relations Manual

The PR Committee has directed the writing and editing of the final draft of a PR handbook entitled "Public Relations 'Know How' for the Professional Engineering Society." This handbook contains practical information on how to develop PR programs at the local level. It will be distributed to the Society membership by March.

E—Recommendations

In order to reach effectively the vast television and radio audience, we should try to reach the producers of the many local shows and features as well as the producers of the network performances. This can best be done by personal contacts and by letters addressed to such producers by chapters and supplemented by letters from individual members.

Your Committee recommends that all chapters establish sub-committees on television and radio programming within their PR committees. Such sub-committees should consist of members who are particularly interested in television and radio as media of mass communication, and who can select and effectively correspond with producers of good popular programs.

Board Action: Report received.

REGISTRATION

Your Registration Committee has no special recommendations to give you at this time. We do wish to cover the activities of the committee since the Memphis meeting, giving you the results obtained on several issues discussed at that time. We also want to discuss the subjects of national registration, registration by endorsement, and the requirements of the various state registration boards. We hope, by this discussion, to show you how varied are the requirements of the states and that until these requirements are brought more nearly in line considerable difficulty will continue to be experienced in registration by endorsement and any semblance of national registration.

Canal Zone Law

The committee met at the NSPE office on November 18th. House Resolution 7811, which is an amendment to the Canal Zone Code providing for the registration of architects and engineers, was discussed. This bill gives the Governor of the Canal Zone the authority to prescribe rules and regulations under which architects and engineers could obtain registration and could practice. After a careful review of the methods used in the Canal Zone in registering members of other professions, and finding that the same procedure has been followed, we approved the bill in its present form. A letter was written on November 23rd to the Honorable Edward A. Garmatz, chairman of the House Committee for the Canal Zone, advising him that we had approved the bill as written and that we would aid in its passage.

When this bill is passed by Congress it will be the duty of the Governor of the Canal Zone to appoint a registration board and prescribe rules and regulations for it to follow. These rules and regulations which had been compiled by the committee of architects and engineers of the Canal Zone were carefully studied by this committee. Since they covered both architects and engineers we did not feel competent to pass on the regulations as written. We did suggest several minor changes in wording for sake of clarity and approved the regulations insofar as engineering was concerned. We suggested that two sets of regulations be approved by the governor, one for engineers and one for architects. The result of this study was transmitted to the chairman of the Canal Zone committee on December 7th. At the time this report is being written no word has been received from that committee.

Ideal Engineering Registration Law

Prior to the November 18th committee meeting the first draft of an Ideal Engineering Registration Law was written. It included the best features of all present state laws and in addition all of the standards which have been approved by NCSBEE.

In reviewing this first draft the committee decided that any Ideal Engineering Registration Law must have the following provisions:

1. Require registration of engineers only.
2. Be as short and brief as possible.
3. Be strong in its terms.
4. Provide for registration 40 years in the future.

Since this first draft was designed after the present state laws, was long and ambiguous, and did not contain the provisions stated above, it was decided to rewrite it to include them. That is now being done.

National Registration

At the Memphis Board meeting Recommendation No. 1 of this committee was approved. It stated:

"That NSPE cooperate with other societies, especially NCSBEE and NBER, in the formation of some plan which will eventually

(*Continued on page 47*)

NEW Processes . . .

Improved Methods Speed Construction of Mackinac Bridge

ALTHOUGH it will be more than a year before motorists will be using Michigan's record-span Mackinac Bridge, it is already of interest to engineers as a tremendous achievement brought about by improved methods.

The huge four-lane toll bridge linking the Upper and Lower Peninsulas of Michigan will be supported on 34 concrete piers, some of them founded on rock over 200 feet below the level of the Straits of Mackinac. All of the concrete required in the construction of these piers, approximately 440,000 cubic yards, is being made by the mortar intrusion method, an innovation in major bridge building. Engineers and contractors point to outstanding records already set in concrete-placement on the Mackinac job and credit the use of the mortar intrusion method.

All concrete for the foundation piers of the Mackinac Bridge is being placed by the Prepakt method developed by Intrusion-Prepakt, Incorporated of Cleveland. Speedy placement of Prepakt concrete is possible because all aggregate, over 60% of the total concrete volume, is preplaced in cofferdams and forms without mixing and is not subject to the speed limitations of concrete mixers. The mixing plant handles less than 40% of the total volume, the Intrusion mortar, which is used to consolidate the stone into Prepakt concrete. As this Intrusion mortar is pumped into aggregate, it displaces the water without dilution and completely fills all voids.

Intrusion mortar is composed of cement, Alfesil (a specially selected pozzolan), sand, water and Intrusion Aid. The last is a patented admixture that makes the unique Prepakt technique possible. It provides fluidity at low water-cementing materials ratios, suspends solid particles in fluid mortar, delays early stiffening and compensates for setting and settling shrinkage. Intrusion Aid also gives the mortar the ability to displace water completely, making underwater Prepakt concrete indistinguishable from that made in the dry.

To facilitate handling of the Intrusion Aid, which is a fine, powdery substance, specifications called for a container to be waterproof, easily sealed and reopened, sufficiently strong to withstand considerable handling, and of an exact size for proper batching. To meet these specifications, a special four-ply bag with an asphalt inner lining was originated by Chase Bag Company of Chicago for this project.

Instead of mixing concrete in the conventional manner on land, the bulk of the concrete, composed of inert stone aggregate, is dumped directly into the bridge's cofferdams and caissons by self-unloading boats.

Placing it into the water in this form, without waiting for it to be mixed into concrete, not only shortcuts handling methods but quickly stabilizes the cofferdams and minimizes the danger of storm damage during construction. One of the huge monoliths, Pier 17, contains 85,000 cubic yards of concrete. The monolith measures 115 feet wide by 135 feet long, and is founded on bedrock 88 feet below the surface of the water.

Due to its large size the cofferdam bracing had to be fabricated and installed in three vertical sections. Each of the individual bracing sections is 115 feet long, 45 feet wide and 60 feet high. The sections were assembled on shore, barged to the site, then lowered into position by floating derricks. Once in position divers descended and bolted the sections together under water.

After dumping of the inert aggregate the mortar is easily handled on a single 50 by 150 foot barge. This barge is a floating mortar producing plant with fully integrated batching, mixing and pumping equipment. It is felt, however, that four or possibly five barges would have been necessary if the special additive, Intrusion Aid, had not been used. Under conventional conditions it would also have been necessary to maintain a large stockpile of materials on a vessel of considerable size.

The mortar containing Intrusion Aid is batched and mixed on the boat, fed to pumps and forced through a network of flexible hoses and steel pipes into the waiting aggregate in the caissons. The special mortar rapidly fills the voids in the aggregate and consolidates it into concrete.

The injection pipes are spaced 10 to 20 feet apart and are withdrawn as the mortar rises in the aggregate. A series of sounding walls are installed to determine the height of the mortar. They also help maintain a uniform level during concreting operations.

The savings in time and money by this method of making concrete are notable. During one 24-hour period some 6,250 cubic yards of concrete were placed with 2,300 cubic yards recorded in one eight-hour shift—a world's record for underwater concrete placement—and this from a single floating plant. During this 24-hour period the mortar producing boat used about 2,178 tons of sand, 935 tons of cement, 498 tons of fly ash, and about 15 tons of the Intrusion Aid, to mix and pump more than 65,700 cubic feet of mortar for solidifying the aggregate that had already been dumped into position.

Showing simultaneous placement of coarse aggregate and pumping of Intrusion mortar on one of the Main Suspension Tower Piers.

With Our Members . . .

National Engineers' Week

Coast to Coast Success Is Indicated By Early Reports on the Observance

As the March issue of the AMERICAN ENGINEER goes to press, reports from chapters and state societies are pouring in to NSPE headquarters indicating that the February 19th to 25th observance of National Engineers' Week marked another highlight in the Society's history.

Among the state governors signing early proclamations and paying special tribute to the profession were Governors Phil M. Donnelly of Missouri, William G. Stratton of Illinois, Robert B. Meyner of New Jersey, Arthur B. Langlie of Washington, Christian Herter of Massachusetts, and Goodwin Knight of California.

Many of the NSPE affiliates keyed special Engineers' Week banquets to the interest of young people in engineering as a career, and chapter members brought students from area colleges or high schools as their guests. Among the groups offering such programs were the North Shore Chapter of the Massachusetts SPE, the Westchester County Chapter of the New York State Society, and the Delaware SPE.

Other chapters scheduling a week-long program of events made special provision for the career-conscious in their programs. The St. Louis Chapter of the Missouri SPE arranged for a TV program on February 23 during which Dr. Charles Kimball, president of the Midwest Research Institute of Kansas City, spoke on *Engineering as a Professional Career*. The Reading Chapter of the Pennsylvania Society arranged for a visit to the engineering offices of Gilbert Associates, Inc., by interested students from some fourteen high schools in the Berks County area. "Engineers' Day" was also the theme of the February 23rd luncheon meeting of the Tulsa, Oklahoma, Chamber of Commerce, and members of the local OSPE chapter sponsored the attendance of Tulsa high school students to hear an address on career planning by Harry C. Kelly of the National Science Foundation.

Dr. A. A. Potter, dean emeritus of engineering at Purdue University, was the guest speaker at the February 21st banquet of the Lafayette Chapter of the Indiana SPE. NSPE Executive Director Paul H. Robbins was the Engineers' Week speaker in Buffalo, New York, for the Erie County Chapter's banquet. The Erie County P.E.'s also sponsored a panel discussion on *The Economic Status of Engineers* at the local Technical Societies' Council conference.

The Women's Auxiliary to the Mahoning Valley Chapter of the Ohio SPE joined in the sponsorship of the February 22nd banquet and dance. An "Engineers' Ball" on February 24th was the highlight of the observance of the Maumee Valley Chapter, also an affiliate of the Ohio Society. In Toledo, the local SPE group had the cooperation of the Toledo Technical Council in sponsoring the February 23rd banquet at which William C. Newberg, president of the Dodge Division of the Chrysler Corporation was the featured speaker.

Milwaukee, Wisconsin, was another city where the various local engineering societies joined forces, and Commander George W. Hoover, USN, was the guest speaker at the joint banquet, discussing the subject, *Why an Earth Satellite?* In Detroit, *The Foundation*, the official publication of the Engineering Society of Detroit, accorded editorial space to the Detroit Chapter of the Michigan SPE for the presentation of an article which was written by chapter member Murray D. Van Waggoner, a consulting engineer and a former governor of the State.

The Minnesota, Kansas, New Mexico, Oklahoma, Tennessee, and Georgia Societies all scheduled their annual meetings during the Week with appropriate recognition of the National Engineers' Week theme being given in their programs.

The Sabine Chapter of the Texas SPE held a banquet at the Hotel Beaumont as the highlight of the Week's program, while the Lamar Tech Student Chapter, affiliated with the group, held its annual exhibit to mark the week-long event.

A unique feature of the banquet sponsored by the Richmond Chapter of the Virginia SPE was the presentation of a copy of President Eisenhower's Engineers' Week letter to each guest.

Everett S. Lee, manager of technical public relations for the General Electric Company and editor of the *Gen-*

They Made Columbia Chapter Plans

Seated around the table are the members of the Publicity Committee of the Columbia Chapter of the South Carolina SPE, who planned the local observance of Engineers' Week. Left to right are: Alton T. Reddick, Robert D. Lambert, Chapter President Marcus Durlach, Russell B. Maxey, and John W. Walker. Others (not pictured) who joined in the planning were T. A. Armour, chapter secretary, and A. O. Blackstone, treasurer.

Missouri SPE Plans Educational Brochure

The Education Committee of the Missouri Society of Professional Engineers is now preparing a brochure for high school counselors in Missouri. It will serve to pinpoint the Missouri situation in regard to the study of math and science in the schools.

H. O. Croft is chairman of the Committee which expects to have the brochure ready for publication at an early date.

eral Electric Review, was the featured speaker at the February 23rd banquet sponsored by the Arizona SPE at the Hotel Westward Ho in Phoenix, with leading public officials as guests. Similar banquets, radio and TV programs, public forum discussions, and many other events were sponsored by other P.E. groups from coast to coast as the Week of special tribute to the engineering profession came to a successful conclusion.—***End.***

Idaho Annual Meeting

The annual meeting of the Idaho Society of Professional Engineers was held in Boise, January 19-21, as part of the 1956 Engineers' Convention sponsored jointly by the ISPE and the local units of the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, and the American Institute of Electrical Engineers.

A panel discussion on *The Development of Idaho's Resources: Present and Future* was one of the highlights of the meeting, as was also the address delivered by NSPE President Allison C. Neff at the ISPE banquet that climaxed the three-day event. Mr. Neff's subject was *An Engineer Looks at American Business.*

Other outstanding speakers were provided by the various co-sponsors, and a special program was arranged for the ladies.

Community Planning Discussed In Ohio

Robert H. Green, who is in charge of work on the "Lima-Allen County Master Plan," was the featured speaker at the late-January meeting of the Maumee Valley Chapter of the Ohio Society. Mr. Green spoke on the subject, *The Importance of Community Planning.*

Past Presidents' Night In Erie County

Nearly two hundred area engineers attended the "Past Presidents' Night" meeting of the Erie County Chapter of the New York State SPE held recently in Buffalo. The special guests included fourteen past presidents of the chapter.

Speaker of the evening was John W. Johnson, also a past president of the Erie County group, and now superintendent, New York State Department of Public Works. Mr. Johnson spoke on the engineering activities directed by his office.

School Superintendent Discusses Science Courses

Dr. Allen H. Wetter, Superintendent of Schools in Philadelphia, was the guest speaker at the February 2nd meeting of the Philadelphia Chapter of the PSPE. Dr. Wetter discussed science and mathematics instruction in the school system under his direction.

> ***Next Month . . .***
> **Don't miss the special round-up of outstanding NATIONAL ENGINEERS' WEEK events which will be featured in the April *American Engineer*. It is going to be a story of real accomplishment.**

New Officers In Springfield, Ill.

New officers have recently been installed by the Capital Chapter of the Illinois SPE. They are: Arthur A. Thorsell, president; R. Dean Collins, vice president; Verdun Randolph, secretary; and Emmons Patterson, treasurer. Arthur Kessell has also been elected chapter representative to the ISPE Board to assume this office in April.

The featured speaker at the installation meeting was Norman C. Bird, chief engineer of the Illinois Department of Aeronautics.

P.E. Named "Outstanding Young Man"

Rex Mayfield, vice president of The Electric Sales Company, Canton, Ohio, and a member of the Canton Regional Society of Professional Engineers, was recently chosen for the local Junior Chamber of Commerce Award as the "Outstanding Young Man of 1955."

The award was presented to the 34-year-old Mr. Mayfield in recognition of the outstanding civic service he has given to the City of Canton. Consisting of a plaque, a certificate, and a gold key, it was presented to him during the Jaycee banquet at the Onesto Hotel on January 21.

Mr. Mayfield is currently serving as co-chairman of the program committee for the Canton P.E. Chapter.

Albany County P.E.'s Hear Steel Engineer

Anthony Graae, a metallurgical engineer with the Allegheny Ludlum Steel Corporation, Watervliet, New York, was the guest speaker at a recent meeting of the Albany County Chapter of the New York State SPE. Mr. Graae discussed the subject, *Hot Extrusion Process of Stainless Carbon Tool Steel.*

. . . more news on page 41

NASSAU COUNTY OFFICERS—The above picture was made during the recent installation meeting of the Nassau County Chapter of the New York State SPE. Participating in the installation ceremony, left to right, are: John Gregg, secretary; Richard Wagner, Jr., director; A. Sol Uman, president; Frank W. Kline, director; New York State Assemblyman Anthony Barbiero, the installing officer; Clifford J. Dvorak, director; John Campani, financial secretary; Charles R. Hiers, retiring president; Emmett Bowker, vice president; and Kurt Groepler, proxy for Anthony Giardina, treasurer.

Outgoing President Hiers was presented with a gift in appreciation for his service during the two terms he served.

A buffet supper was served to the engineers and their wives, and dancing followed the conclusion of the installation ceremony. Mr. Bowker served as chairman in charge of arrangements.

PROFESSIONAL DIRECTORY

KIRK & COWIN

Ralph E. Kirk—Percy G. Cowin
Consulting—Appraisals—Reports
Registered Professional Engineers

One-18th Street, SW Birmingham, Alabama
Phone 56-5566

PALMER AND BAKER, INC.

Consulting Engineers — Architects

Surveys, Reports, Design, Supervision, Consultation, Traffic Problems, Tunnels, Bridges, Highways, Airports, Industrial Buildings, Waterfront & Harbor Structures, Complete Soils, Materials & Chemical Laboratories.

Mobile, Ala. **New Orleans, La.**
Harvey, Louisiana

A. W. WILLIAMS INSPECTION CO.

Mobile, Ala.
Established 1921

Inspection—Tests—Analyses
Sampling
Foundation Investigations
Representatives throughout U.S.A.

Member A.C.I.L.

KAISER ENGINEERS

Division of Henry J. Kaiser Company

ENGINEERS — CONTRACTORS

1924 Broadway, Oakland 12, California

SVERDRUP & PARCEL, INC.

Consulting Engineers

Bridges—Structures—Highways
Industrial and Power Plant
Engineering

915 Olive Street, St. Louis 1, Mo.
417 Montgomery St., San Francisco, Calif.

GEORGE V. R. MULLIGAN, P.E.

Management Consultant

Operation Analysis
Manpower Utilization
Management Controls

601-19th Street, N.W. **Washington, D. C.**

CONWELL LUCAS

Geologists — Engineers

Seismic Exploration
Dams — Tunnels — Power Plants
Ground Water Hydrology

1773 Williams Street **Denver 18, Colorado**

SOUTH FLORIDA TEST SERVICE

Testing—Inspection—Research—Engineers

Consultants and specialists in corrosion, weathering and sunlight testing.

4301 N.W. 7th Street **Miami 34, Florida**

Member A. C. I. L.

LAW—BARROW—AGEE LABORATORIES, INC.

Foundation Investigations
Physical & Chemical Testing

Main Laboratories: Atlanta, Ga.
Charlotte, N. C., Albany, Ga., Tampa, Fla.

MERRITT & WELKER

Engineers

Water Systems — Natural Gas Systems
Sewer Systems — Streets & Roads

Marietta, Georgia

ROBERT AND COMPANY ASSOCIATES

Consulting and Designing Engineers

Industrial Plants—Municipal, Highway and Airport Improvements — Power Plants — Water Supply — Sewage and Industrial Waste Disposal — Appraisals — Reports.

Atlanta **Georgia**

CONSOER, TOWNSEND and ASSOCIATES

Water Supply, Sewerage, Flood Control and Drainage, Bridges, Express Highways, Paving, Power Plant, Appraisals, Reports, Traffic Studies, Airports Gas & Electric Transmission Lines

351 E. Ohio St., Chicago 11, Illinois
9½ N. Indiana St., Greencastle, Ind.

CRESCENT ENGINEERING COMPANY, INC.

Contracting & Consulting Electrical Engineers

Design, Supervision and Construction Process Power and Lighting for Industrial Plants

6455 S. Central Avenue, Chicago 38, Illinois

DeLEUW, CATHER & COMPANY

Consulting Engineers

Transportation, Public Transit and Traffic Problems

Industrial Plants, Grade Separations, Railroads, Subways, Power Plants, Expressways, Tunnels, Municipal Works

150 N. Wacker Drive **79 McAllister St.**
Chicago 6 **San Francisco 2**

FRASER, WEIR & ASSOCIATES, INC.

Industrial Consultants
Controlled Maintenance Installations

20 North Wacker Drive
Chicago 6, Illinois

LOUIS J. LUCAS

Industrial Management Engineer

A Personal Service . . .
In designing, installing and supervising to a successful conclusion, those products, controls, methods, procedures and systems needed in a profitable operation . . .
Since 1925

1055 Granville Avenue **Chicago 40, Illinois**

PAUL WEIR COMPANY

Mining Engineers and Geologists
Management and Consultation
Design and Construction

20 North Wacker Drive
Chicago 6, Illinois

PAUL BERG

Consulting Engineer

Specializing in Feed Milling and Grain Elevators
Registered Ten States

130½ E. Wayne St. **Phone E-7558**
FORT WAYNE, IND.

PLUMB, TUCKETT & PIKARSKY

Consulting Engineers

Railway & Highway Bridges
Investigations, Reports, Design
Maintenance and New Construction

2649 Wabash Ave. **Gary 3, Indiana**

WILSON & COMPANY

ENGINEERS

Salina, Kansas
Albuquerque, New Mexico
Denver, Colorado

EUSTIS ENGINEERING COMPANY

FOUNDATION AND SOIL MECHANICS INVESTIGATIONS

Soil Borings—Laboratory Tests
Foundation Analyses—Reports

3635 Airline Highway
New Orleans 20, La.

WHITMAN, REQUARDT & ASSOCIATES

Engineers — Consultants

Civil—Sanitary—Structural
Mechanical—Electrical

Reports, Plans Supervision, Appraisals

1304 St. Paul Street, Baltimore 2, Maryland

FAY, SPOFFORD & THORNDIKE

Engineers

John Ayer — Ralph W. Horne
Bion A. Bowman — William L. Hyland
Carrell A. Farwell — Frank L. Lincoln
Howard J. Williams

Airports, Bridges, Turnpikes
Water Supply, Sewerage, Drainage
Port and Terminal Works
Industrial Building

Boston **New York**

METCALF & EDDY

Engineers

Water, Sewage, Drainage, Refuse and Industrial Wastes Problems
Airports — Valuations
Laboratory

Statler Building **Boston 16, Mass.**

COMMONWEALTH ASSOCIATES INC.

Consulting and Design Engineers

Power Generation
Electric—Gas—Water Systems
Industrial Planning

252 W. Cortland St. **Jackson, Michigan**

EUGENE K. FALLS

Consulting Engineer

PRESSURE RELIEVING SYSTEMS
Process Industries, Utilities
Manufacturing, Commercial, Residential
SAFETY VALVES • RELIEF VALVES
Consultation, Development
Design of Test Facilities,
Performance Tests, Modernization,
Special Applications

4445 North River Road, Port Huron, Mich.

ORRIN E. FENN

CONSULTING — DESIGN

Complete Engineering Service
Air Pollution—Fume and Dust Control
Finishing Systems for Painting, Plating and Porcelain Enamel
Industrial Ovens and Dryers

38128 Lake Shore Dr. **Mt. Clemens, Mich.**

PROFESSIONAL DIRECTORY

Alphabetized by States . . .
Michigan-New York

THE HINCHMAN CORPORATION
Consulting Engineers
CORROSION CONTROL — Surveys, Reports, Design, Specifications, Evaluation
UNDERGROUND UTILITIES — Location, Mapping, leakage surveys, electrical grounding systems
HOLLOW PILING—Directional Surveys by electronics
Francis Palms Building Detroit 1, Mich.

BETTENBURG, TOWNSEND & STOLTE
Registered Professional Engineers
A complete professional service
1437 Marshall Ave., St. Paul 4, Minn.
Tel.: NEstor 6191

BLACK & VEATCH
Consulting Engineers
Water—Sewage—Electricity—Industry
Reports, Design
Supervision of Construction
Investigations, Validation and Rates
4706 Broadway, Kansas City 2, Mo.

BURNS & McDONNELL
Consulting and Designing Engineers
P.O. Box 7088 Kansas City, Mo.
Telephone DElmar 4375

A. C. KIRKWOOD & ASSOCIATES
ENGINEERS
CONSULTANTS
7800 The Paseo
Kansas City 10, Mo.

RUSSELL & AXON
Consulting Engineers
Civil — Sanitary — Structural
Industrial — Electrical
Rate Investigations
408 Olive St., St. Louis 2, Mo.
Municipal Airport, Daytona Beach, Fla.

J. Z. JIZBA
Civil Engineer & Architect
Bridges, Buildings, Drainage, Highways
Design, Survey, Supervision
5417 Ogden Street Omaha 4, Nebraska

FRANK E. HARLEY AND ASSOCIATES
Water Works, Sewage, Municipal Highways
Harley Building
860 Godwin Avenue Wyckoff, N. J.

UNITED STATES TESTING COMPANY, INC.
Engineering Testing and Inspection
Development—Research—Consulting
Soils • Concrete • Steel • Welding
Pipe • Brick • Tile
Main Laboratories: Hoboken, New Jersey
Boston, Denver, Chicago, Dallas, Memphis, New York, Wilmington, Philadelphia, Providence, Los Angeles

AMMANN & WHITNEY
Consulting Engineers
Design and Supervision of Construction of Bridges, Highways, Expressways, Buildings, Special Structures, Airport Facilities
111 Eighth Avenue, New York 11, N. Y.
724 E. Mason Street, Milwaukee 2, Wisc.

BROWN & BLAUVELT
Industrial Plants, Bridges, Dams, Airports, Expressways, Parkways, Highways, Preliminary Reports, Engineering Design, Construction Supervision, Material Controls and Testing, Municipal Engineering Services, Tax Maps, Surveying
468 Fourth Avenue New York 16, N. Y.

DRAKE & TOWNSEND, INC.
PROPANE PLANTS
Standby — Augmentation
100% Town or Plant Supply
Consulting — Design
Engineering — Construction
11 West 42nd St., New York 36, N. Y.

Restricted to Registered Professional Engineers . . . Directory Continued on Next Page

Outstanding Teachers Selected In Wisconsin

Three Wisconsin high school teachers were honored during the recent annual meeting of the WSPE as outstanding science instructors. They were: Frederick W. Schuler, West High School, Madison; Sister Mary de LaSalle, Pius XI High School, Milwaukee; and Harry R. Hertz, Brandon Public High School, Brandon.

The certificates of award were presented to the three teachers by Kurt F. Wendt, dean of the College of Engineering, University of Wisconsin, in a special ceremony on January 28.

Others taking part in the award presentation program were: John Gammel, director of graduate training, Allis-Chalmers Manufacturing Company; William D. Bliss, dean of the College of Engineering, Marquette University; and Fred J. Van Zeeland, dean of engineering, Milwaukee School of Engineering.

Selection of the outstanding teachers was based on the recommendations of over eighty-five high school principals from all parts of Wisconsin, plus a study of the records of engineering and science colleges in the State where the teachers' students were or had been continuing their science study careers.

. . . *more news on page 43*

ANOTHER WISCONSIN HONOREE —Another award presented at the recent annual meeting in Milwaukee of the Wisconsin SPE was the certificate for the year's "Outstanding Engineer." The recipient of this honor was Edwin J. Kallevang of Madison, retired vice president of engineering of the Wisconsin Power and Light Company, a past president of the WSPE and a former national director of NSPE. The picture at the right shows Mr. Kallevang (center) holding his award certificate as he receives the congratulations of Owen A. Ayres of Eau Claire (left), president of the WSPE. O. J. Muegge of Madison, state sanitary engineer, looks on.

Alphabetized by States . . .
New York-Pennsylvania

PROFESSIONAL DIRECTORY

FOSTER & CAFARELLI
Engineers

Port Development, Shipyards, Drydocks, Power Plants, Distribution Systems, Industrial Plants, Commercial Buildings, Surveys, Reports, Estimates, Design, Supervision, Consultation.

44 Whitehall Street, New York 4, New York

HARDESTY & HANOVER
Consulting Engineers

Bridges—Long Spans of All Types
Movable—Lift, Bascule and Swing
Hanover Skew Bascule, Steel and Concrete Spans
Grade Crossing Eliminations
Expressways and Thruways
Other Structures, Foundations
Supervision, Reports, Appraisals

101 Park Avenue **New York 17, N. Y.**

FREDERIC R. HARRIS, INC.
Consulting Engineers

Harbors, Piers & Bulkheads, Drydocks, Foundations, Soil Mechanics, Sanitary & Industrial Waste Disposal, Airports, Highways, Bridges

27 William Street **New York 5, N. Y.**

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
Consulting Engineers

Bridges, Structures, Foundations
Express Highways
Administration Services

1805 Grand Avenue **55 Liberty Street**
Kansas City 8, Mo. **New York 5, N. Y.**

MADIGAN-HYLAND
Consulting Engineers

28-04 41st Avenue

Long Island City, New York

JAMES P. O'DONNELL
Engineers

Professional Engineering for the Petroleum and Process Industries

39 Broadway **Bowie Building**
New York 6, N. Y. **Beaumont, Texas**

PARSONS, BRINCKERHOFF, HALL & MACDONALD
Engineers

Bridges, Highways, Tunnels, Airports, Subways, Harbor Works, Dams, Canals, Traffic, Parking and Transportation Reports, Power, Industrial Buildings, Housing, Sewerage and Water Supply.

51 Broadway, New York 6, N. Y.

PRAEGER-KAVANAGH
Engineers

126 East 38th St. **New York 16, N. Y.**

SEELYE STEVENSON VALUE & KNECHT
Consulting Engineers
Richard E. Dougherty, Consultant

Airports, Highways, Bridges, Dams, Water Supply, Sanitation, Tunnels, Industrial Plants, Concrete, Steel, Industrial Waste Disposal, Foundations, Soil Studies.
Civil—Mechanical—Electrical

101 Park Avenue **New York 17, N. Y.**

SINGSTAD & BAILLIE
Consulting Engineers

Ole Singstad — David G. Baillie, Jr.
Tunnels, Subways, Highways
Foundations, Parking Garages
Investigations, Reports, Design
Specifications, Supervision

24 State St. **New York 4, N. Y.**

D. B. STEINMAN
Consulting Engineer

HIGHWAYS — **BRIDGES** — STRUCTURES

Design — Construction — Investigations
Strengthening — Reports — Advisory Service

117 Liberty Street **New York 6, N. Y.**

SYSKA & HENNESSY, INC.
Engineers

Design, Reports, Consultation
Power Plant, Disposal Plant,
Water Systems

NEW YORK, N. Y.

TIPPETTS-ABBETT McCARTHY-STRATTON
Engineers

Ports, Harbors, Flood Control, Irrigation
Power, Dams, Bridges, Tunnels, Highways
Subways, Airports, Traffic, Foundations
Water Supply, Sewerage, Reports, Design
Supervision, Consultation

62 West 47th Street **New York City**

New York — Washington — St. Louis — Oklahoma City

ADACHE & CASE, ENGINEERS
The Arcade **Cleveland 14, Ohio**

Aircraft Turbo-Jet Laboratories
Minus 100° to Plus 1000°
400 High Temperature Hot Water District Heating

ELMER S. BARRETT ASSOCIATES
CONSULTING ENGINEERS

Surveys—Design—Inspection
Highways — Municipal
Bridges — Reports
Transmission Lines

249 S. Paint St. **Chillicothe, Ohio**
Phone: 3-2287

E. D. BARSTOW & ASSOCIATES
E. D. Barstow—T. A. Gilliam

Water Supply, Sewerage,
Highways, Structures, Industrial

163 N. Union Street **Akron 4, Ohio**

GEORGE W. BRANDT, ENGINEER
Consulting • Design •

Mechanical • Development • Fabrication

Box 101 **West Milton, Ohio**

GUSTAVE M. GOLDSMITH
Consulting Engineer

General Structures — Plant Layout
Design—Investigation—Quantity Surveys

1734 Bella Vista **Cincinnati 37, Ohio**

EMMET J. McDONALD
CIVIL ENGINEER

HIGHWAYS, MUNICIPAL, SURVEYS

337 Rhodes Avenue **Akron 2, Ohio**

THE H. C. NUTTING COMPANY
Engineers and Chemists

Foundation Investigations
Core Drilling
Water and Waste Surveys
Complete Testing Service

4120 Airport Road, Cincinnati 26, Ohio
2145 N. W. 2nd Ave., Miami 37, Florida

H. R. RICHARDS — A. V. ALEXEFF & ASSOCIATES
Consulting — Design
Development — Fabrication
Heat Processing Equipment
INDUSTRIAL OVENS, INC.
13825 Triskett Rd., Cleveland 11, Ohio
Tel. CL-1-4400

JOHN OSTBORG
Engineer Designer

Diesel Engine Design Consultant
Mechanical Engineering & Design Service

31 E. High Street **Springfield, Ohio**

TOLEDO TESTING LABORATORY
Engineers and Chemists

Concrete — Soils — Asphalt
Inspection — Tests — Supervision
Consultation — Specifications and Investigation of
Engineering Works and Materials

1810 North 12th St. **Toledo 2, Ohio**

OKLAHOMA TESTING LABORATORIES
Registered Engineers—Chemists
Oklahoma City, Okla.
Materials Testing and Inspection
Member A. C. I. L.

C. A. Lashbrook — **Owner-Director**
M. A. Witte — **Chief Engineer**

ALBRIGHT & FRIEL, INC.
Consulting Engineers

Water, Sewage, Industrial Wastes and Incineration Problems
City Planning, Highways, Bridges and Airports
Dams, Flood Control, Industrial Buildings
Investigations, Reports, Appraisals and Rates
Laboratory For Chemical & Bacteriological Analyses
Complete Service on Design and Supervision of Construction

Three Penn Center Plaza, Phila. 2, Pa.

MICHAEL BAKER, JR., INC.
Consulting Engineers

Highways, Airports, Waterworks, Sewers, Sewage Treatment, City Planning, Surveys, Photogrammetric Mapping

Baker Building—Rochester, Penna.
Branch Offices
Harrisburg, Pa., Jackson, Miss., College Park, Maryland

CAPITOL ENGINEERING CORPORATION
Engineers—Constructors—Management

Design and Surveys — Roads and Streets
Sewer Systems — Water Works
Planning — Airports
Bridges — Turnpikes — Dams

Executive Offices: Dillsburg, Pennsylvania
Washington, D. C. — **Pittsburgh, Pa.**
Dallas, Texas — **Paris, France**

PROFESSIONAL DIRECTORY

Alphabetized by States . . .
Pennsylvania-Texas

FRAZIER-SIMPLEX, INC.
CONTRACTING & CONSULTING ENGINEERS
Furnace Engineering for the Glass and Steel Industries
436 East Beau Street, WASHINGTON, PA. U. S. A.

GREEN ENGINEERING COMPANY
Consulting Engineers
Highways, Bridges, Buildings, Industrial Plants
Pittsburgh, Pa.
Philadelphia, Pa. — Baltimore, Md.
Boston, Mass. — Washington, D. C.
Chicago, Ill. — Miami, Florida

MODJESKI AND MASTERS
Consulting Engineers
G. H. Randall — J. R. Giese
C. W. Hanson — H. J. Engel
F. M. Masters
Design and Supervision of Construction
Inspection and Reports
Bridges, Structures and Foundations
State St. Bldg., Harrisburg, Pa. — New Orleans, La. Philadelphia, Pa.

HARRIS HENRY LANTZ & POTTER
Consulting — Design — Reports
Mechanical — Electrical — Civil
Architectural
Spring Valley — R.D. 3, Doylestown, Pa.

HALL LABORATORIES, INC.
Consultants on Industrial Water Problems
Boiler Water Conditioning, Cooling Water Treatment, Process and Waste Water Engineering Service
P. O. Box 1346 (323 Fourth Ave.) — Pittsburgh 30, Pa.

CYRUS WM. RICE & CO., INC.
Consulting Chemical Engineers
Industrial Water and Waste
16 Noble Avenue, Pittsburgh 5, Penna.

HOPF AND BERTALOTT
Adolf R. Hopf, P.E. — Albert Bertalott
Industrial Engineers
Management Consultants
Rittenhouse 6-9071
1505 Race Street — Philadelphia 2, Pa.

THE KULJIAN CORPORATION
Engineers • Constructors • Consultants
POWER PLANTS
(Steam, Hyro, Diesel)
Oil Refineries, Pipe Lines • Chemical Plants • Textile Plants • Breweries, Food Processing Plants • Airports, Hangars Army, Navy Installations
1200 No. Broad St., Philadelphia 21, Pa.

EMERSON VENABLE
Chemist and Chemical Engineer
Chemical Analysis
Research — Development
Trouble Shooting
6111 Fifth Ave., Pittsburgh 32, Pa.

GANNETT FLEMING CORDDRY & CARPENTER, INC.
Engineers
Water, Sewage, Roads, Turnpikes
Bridges, Airports, Traffic, Appraisals
HARRISBURG, PA.
Philadelphia, Pa. — Daytona Beach, Fla.
Pittsburgh, Pa. — Medellin, Columbia, S.A.

LAWRIE & GREEN & ASSOCIATES
Architectural and Engineering Offices
321 N. Front Street
Harrisburg, Pennsylvania
Ritchie Lawrie, Jr., P.E., Consulting Engineer

ENGINEERS TESTING LABORATORY, INC.
FOUNDATION AND SOIL MECHANICS INVESTIGATIONS
Soil Borings — Laboratory Tests
Foundation Analyses — Reports
3313 Main Street — Houston, Texas

Restricted to Registered Professional Engineers . . . Directory Continued on Next Page

Personnel Management Is Lecture Topic

Personnel Management and the Engineering Profession was the subject of the lecture given before a recent meeting of the Central Chapter of the Arizona Society by Professor Clyde Thoroman of Phoenix College.

NSPE President Allison C. Neff of Middletown, Ohio, was the guest of honor at the meeting which was held in Phoenix.

North Dakota P.E.'s Bestow Tributes

Members of District Three of the North Dakota Society of Professional Engineers held a testimonial banquet and meeting recently to honor the engineers who promoted, designed, and built the Garrison Dam. The meeting was held in Bismarck, and many leading engineering officials were present as guests and as featured speakers.

A. L. Bavone of Minot, NDSPE president, delivered an address paying tribute to the honored engineers.

The other speakers included R. G. Field, head of the Engineering Section, Garrison District, Corps of Engineers; Bruce Johnson, in charge of the Bureau of Reclamation's Missouri-Souris district office; and Murray Baldwin of Fargo.

Everett Lobb acted as master of ceremonies for the event.

Social Event In Corpus Christi

The annual meeting and dinner dance of the Nueces Chapter of the Texas SPE was held recently in the Mirror Room of the Nueces Hotel in Corpus Christi. The chapter's Ladies' Auxiliary also joined in sponsoring the event.

The formal program included the installation of new chapter officers by J. B. Dannebaum, president-elect of the Texas Society, and the presentation of certificates of achievements to the past presidents of the chapter.

The newly-installed Nueces Chapter officers are: Victor Jaeggli, president; Ted Duce, first vice president; O. W. Jones, second vice president; and Klyde Huston, secretary-treasurer. W. M. Goldston, Hugh Wilbanks, and F. A. McCaughan are chapter directors. Neil Waterbury is state director, while Homer Innis is state director-at-large.

Tulsa Installs New Officers

New officers of the Tulsa Chapter of the Oklahoma Society of Professional Engineers took over the administration of the Tulsa unit at the recent annual installation banquet. They are: W. R. Clarke, president; Max T. Nigh, executive vice president; M. J. Peterson, vice president—membership; F. M. Bartlett, vice president—program; C. M. Gordon, vice president—public relations; and M. J. Myers, secretary-treasurer.

Economics Professor Addresses Calif. Group

The February 10th dinner meeting in Stockton of the Stanislaus Chapter of the California SPE featured a lecture by Dr. Arthur Beckwith, professor of economics at the College of the Pacific. Dr. Beckwith discussed economic conditions in Argentina.

. . . more news on page 44

PROFESSIONAL DIRECTORY

Alphabetized by States . . .
Texas-West Virginia

FORREST and COTTON
Consulting Engineers
Regional Water Supplies
Water and Sewage Works
Industrial Development
Airports — Dams
Appraisals — Reports
803 Praetorian Building — Dallas 1, Texas

FREESE & NICHOLS
Consulting Engineers
407-410 Danciger Bldg.
Fort Worth 2, Texas

LOCKWOOD & ANDREWS
Consulting Engineers
Water Works, Sewerage & Sewage Disposal, Public Works, Structures, Earthworks, Mechanical & Electrical.
Reports—Design—Supervision
Surveys—Valuations
Corpus Christi—Houston—Victoria, Texas

HARRY OTIS WRIGHT, JR.
Civil Engineer and Land Surveyor
THE WRIGHT ENGINEERS
Airports, Highways, Sewerage, Waterworks, Sewage Treatment, Land Planning, Surveys, Mapping
Phone: CRescent 3-2882
Post Office Building, Fairfax, Virginia.

FERGUSON-GATES ENGINEERING CO.
Registered Professional Civil and Mining Engineers
Coal Property Reports — Valuation — Development — Plant Design — Ventilation — Dust Surveys
Allen Building — P. O. Box 672
Telephone 5721 — Beckley, W. Va.

FRANK D. McENTEER
Consulting Engineer
BRIDGES, HIGHWAYS, AIRPORTS, INDUSTRIAL PLANTS
Design, Surveys, Investigations
504 Baltimore Ave., Clarksburg, W. Va.

. . . Supplemental Services . . .

ELLMANN ENGINEERING CO., INC.
Electrical Engineers
Designers and Manufacturers of Automatic Control, Alarm and Supervisory Systems for Industrial, Commercial and Institutional Applications.
P. O. Box 3627 — Washington 7, D. C.

A PATENTED
NON-METALLIC CONDUIT SYSTEM
For Conveying Hot or Cold Liquids, Vapors
VERSATILE—CORROSION PROOF—RELIABLE
Write
Water-Tight Underground Conduit
Engineers & Fabricators
P.O. Box 12211 — Houston 17, Texas
P.O. Box 2181 — Atlanta 1, Ga.

PHILIP J. HEALEY, INC.
Engineers and Contractors
TEST BORINGS
CORE DRILLING for FOUNDATIONS
207 Baldwin Ave., Jersey City 6
Jo.Sq. 2-3313
11 Park Place, New York 7
Ba. 7-2728

POINT CONSULTING COMPANY
research and development
Box 8656 — Pittsburgh 21, Pa.

GILES DRILLING CORPORATION
Subsurface Explorations
Large Calyx Holes in Rock
Engineering Geology Reports
2 Park Avenue — New York 17, N. Y.

KENNEDY-RIEGGER DRILLING COMPANY, INC.
Fred W. Riegger, P.E., President, Assoc. Mem. A.S.C.E.
Licensed Professional Engineers
Core Drilling Contractors
Diamond Drill and Test Borings
KIngsbridge 9-3458
5418 Post Road, New York 71, N. Y.

PRECISION WEIGHING
Travelling Balance Repair Service
Purchase and Installation of Precision weighing equipment. Cleaning, Repairing of equipment in your own laboratory if required; making shipment unnecessary. Special weighing assignments undertaken. Preliminary Consultation Suggested.
TURNER BALANCES AND WEIGHTS
Edward H. Turner, P. E.
79 Kenneth Place — New Hyde Park, N. Y.

MANU-MINE RESEARCH & DEVELOPMENT CO.
Soil Solidification
Geological Engineering
Chemical Research
P. O. Box 167
Reading, Pennsylvania

● ***Consult this Directory for Qualified Specialists*** ●

PROFESSIONAL DIRECTORY RATES

12 mos., *paid in advance*	$ 96.00
12 mos., *billed monthly* @ $9.00 ea.	108.00
6 mos., *paid in advance*	54.00
6 mos., *billed monthly* @ $10.00 ea.	60.00

Dr. Van Leer Dies

Dr. Blake Ragsdale Van Leer, president of the Georgia Institute of Technology and long a prominent member of NSPE, died in an Atlanta hospital on January 23.

The fifth president of Georgia Tech, and the first engineer to hold that position, Dr. Van Leer had guided the Institute's programs since 1944. He was also instrumental in the establishment of the Southern Technical Institute at Chamblee, Georgia. He was a registered P.E. in Florida, North Carolina, and Georgia. In addition to the Georgia SPE and NSPE, he belonged to the ASME, the SAME, the ASEE, the Newcomen Society, Tau Beta Pi, and many other scientific and professional organizations.

Dr. Van Leer served in the Corps of Engineers in World Wars I and II, completing his active service as a colonel. He then became active in the Reserve, serving as commanding officer of the 3107th Research and Development Unit in Atlanta, and of the 401st Engineer Brigade.

Caterpillar Plant Visited by P.E.'s

Members of the Central Illinois Chapter of the Illinois SPE were guests of the Caterpillar Tractor Company for a recent dinner meeting. The dinner was held in the Decatur plant cafeteria; and at its conclusion, the P.E.'s were escorted on a tour.

This marked the first meeting at which the newly-installed officers of the chapter were in charge. They are: John Housiaux, president; J. Boyer, vice president; Walter D. Hays, secretary-treasurer; Gilbert D. Henning, director; and Andrew W. Neureuther, chapter representative.

Highway Lecture In Wisconsin

The National System of Highways and How It Affects Wisconsin was the subject of the talk presented at a recently-reported meeting of the Western Chapter of the Wisconsin SPE. V. L. Fiedler, district engineer for the Wisconsin Highway Commission, was the speaker who addressed the P.E.'s and their guests assembled in La Crosse for the meeting.

Research Is Topic For St. Louis Meeting

Research in the Electric Power Industry was the theme of the talk delivered by C. H. Fellows before a recent meeting of the St. Louis Chapter of the Missouri SPE. Mr. Fellows is national president of the American Society for Testing Materials.

Brandt

(*Continued from page* 15)

though, that is rather remarkable is the lack of noise in Russia. The people go about their business very quietly. And when you see a group of people together, whether students or any others, you learn not to expect noise. The contrast was rather startling, as a matter of fact, when we left Leningrad and landed in Helsinki; you noticed right away how the people were talking and smiling. That doesn't mean that the Russians have no sense of humor. Our particular guide and translator had a very fine one. But things are still extraordinarily quiet there.

Q: **Did you have the opportunity to visit any engineering schools while in Russia?**

A: Unfortunately, no.

Q: **Were you welcome in the Soviet Union?**

A: We were treated with the utmost hospitality. Intourist (the Russian Tourist Ministry) handled all arrangements efficiently and with a minimum of effort on our part. Russian engineers seemed willing and anxious to talk over engineering problems with us, and we believe that they were really sincere in this.

Q: **Dr. Brandt, these comments of yours have been very interesting, and we know they will be of considerable value to our readers. Before we conclude this interview, is there any highlight of your trip that we have missed in our questioning? Any particularly outstanding impression that you have brought back with you?**

A: Well, for one thing, I got the definite impression that the Russians know a good deal more about what we are doing in industry than we know about what they are doing. Of course we publish our results more freely than they do, and we mentioned this several times to various Russians. Their only answer was that they didn't believe that the average American could read Russian anyway, even if they did publish more.

(*Continued on page* 49)

CLASSIFIED ADVERTISING

Minimum 3 lines.
Undisplayed: $1.50 per line.
Displayed: Same rate as General Advertising.

Positions Wanted: Undisplayed, 75c per line. Displayed, 50% off General Advertising Rates.
Box Number chargeable as one line.

Mail Box Number replies to:
AMERICAN ENGINEER
1121 15th St., N.W. Washington 5, D. C.

Positions Available

CIVIL ENGINEERS

Work and live in wonderful WISCONSIN

A rapidly expanding highway program offers:

Permanent civil service positions
Rapid advancement
Challenging work
Starting salary based on experience

Civil engineering degree or professional registration required

WRITE TO: **Personnel Officer**
STATE HIGHWAY COMMISSION OF WISCONSIN
State Office Building
Madison 2, Wisconsin

Position Available

INSTRUCTOR OR ASSISTANT PROFESSOR IN ELECTRICAL ENGINEERING: To teach laboratory and lecture courses in circuits, machines and either electronics or power; M. S. degree plus industrial experience required. Good opportunity for advancement in a new department in the process of planning a new building and curricula. Good salary scale. Appointment open September, 1956. Write E. B. Weinberg, Sacramento State College, Sacramento, California.

Placement Service

The following positions are listed with The Ohio Engineers' Placement Service, Inc., address below:

Positions Wanted

Reg. INDUSTRIAL Engr.—Grad. MECHANICAL, Age 42. Courses after graduation in industrial management and engineering. Heavy exp. in Estimating, Industrial Engineering & Production. Over 8 yrs. exp. at staff level in industrial and manufacturing engr. Desires position commensurate with ability and training. Mid-West Area. $800 month. (A-27)

Grad. Reg. MECHANICAL Engr. Age 49. Exp. in supervision of mech. installation, power plant operation, quality control, mechanical maintenance, process inspection. Desires position as plant engr. in charge of maintenance, power, utilities, etc. $500 month. (A-95)

ELECTRICAL Engr. Age 34. 8 yrs. excellent record with present medium-sized utility, 5 as Division Supt. Desires opportunity with a challenge. Proven administrative ability covering design, construction, operation and maintenance of transmission, substation, and distribution. (A-107)

(Small service charge)
THE OHIO ENGINEERS' PLACEMENT SERVICE, INC.
5 East Long St., Columbus 15, Ohio
Affiliated with OSPE

Positions Available

Courses, Training

ENGINEERS
Learn Construction Management
Complete course in the practical "know-how" of organizing and directing large projects on construction. For sample lessons and full particulars—write:
GEO. E. DEATHERAGE & SON
Construction Consultants
411——5th Ave. So. Lake Worth, Fla.

Positions Available

CHIEF DESIGN ENGINEER
Electrical/Mechanical

To be responsible for design, research and development of motors, pumps, heating elements, electrical controls, electrically heated pipe sections. Professional license required in or transferable to Connecticut. Salary $10,000 to $12,000. Send confidential resume to box A-301, AMERICAN ENGINEER.

OPPORTUNITY FOR COMPETENT ENGINEER

In plant Engineering Department of successful, well established Michigan manufacturer. Graduate and/or Registered Engineer preferred — Mechanical, Civil or Electrical.

Age preference — 27 to 35. Permanent position. Minimum of 5 years industrial or building construction experience.

Man with capacity and potential for advancement to responsible position. Company is expanding.

Give details as to education, experience and other qualifications.

Box AD-302, AMERICAN ENGINEER

STRICTLY BUSINESS

Personalities . . . **Edward G. Lowell** has joined **Atomics International,** Canoga Park (Los Angeles), Calif., a division of **North American Aviation, Inc.,** as a senior engineer in the division's Applications Engineering Department. . . . **John S. Rearick** has been elected vice president of **The C. W. Nofsinger Company,** Engineers and Contractors of Kansas City, Mo. . . . **Alvin L. McMullen** has been named to the newly-created post of manager of production of the **Seiberling Rubber Company,** Akron, O., while **Edwin P. Schrank** has been promoted to the position of manager of engineering. . . . **Dr. Ernest A. Keller** has been appointed director of research by **Panellit, Inc.,** Skokie, Ill. . . . The **Badger Manufacturing Co.,** engineers, fabricators, and constructors of chemical and oil refining plants, Cambridge, Mass., has elected **A. J. Broggini** executive vice president and chairman of the Executive Committee. . . . **ALCO Products, Inc.,** Schenectady, N. Y., has announced the appointment of **Captain C. S. Seabring,** USN, ret., as director of research and development. . . . Appointment of **Robert L. Buttle** as ceramics engineer in charge of an experimental program in electronic products has been announced by **R. L. Womer,** vice president and technical director of the **Jeffers Electronics Division** of the **Speer Carbon Company,** St. Marys, Pa.

Mr. Lowell

Howard Laurent has been named chief engineer of the **Rheem Automotive Company,** Los Angeles, according to **O. W. Carrico,** vice president—manufacturing. . . . **Martin Vander Laan** of Clifton, N. J., has been appointed manager of operations of the Engineering Division of **Hewitt-Robins, Inc.,** of New York City. . . . **The Thermoid Company,** Trenton, N. J., has announced the appointment of **J. A. Muller** as technical manager of the Rubber Division, according to **J. R. Keach,** vice president. . . . **Ernest W. Hartman** has been promoted to chief industrial engineer for the Administrative Division of **Owens-Illinois Glass Co.,** Toledo, O. . . . **Albert G. Noble,** Admiral USN, ret., has been elected executive vice president of **Vitro Corporation of America,** New York City, according to **J. Carlton Ward, Jr.,** president. . . . **Bernard Grill** has been named chief product engineer for the **Lewyt Air Conditioner Corporation,** Brooklyn, N. Y. . . . **T. C. Williams,** president of **Stone & Webster Engineering Corporation** of New York and Boston, has announced the election of **Edward J. Ford, Harold J. Sykes** and **Edwin H. Krieg** as vice presidents of the firm.

New Firms . . . **Gordon A. Yale,** a registered professional engineer of Marblehead, Mass., has announced the formation of **Yale Associates,** a firm of technical sales representatives specializing in optical, mechanical, electrical, and electronic measuring instruments and devices. The firm's representatives will cover the New England area. Mr. Yale, who was formerly president of **Stocker & Yale, Inc.,** manufacturers of optical projectors and precision measuring instruments, is now president of the new firm. . . . **Chester L. Wheless** and **Pierre M. Aubuchon** announce the formation of **Wheless and Aubuchon,** a consulting petroleum and natural gas engineering firm. Offices will be in the Perry-Brooks Building, Austin, Texas. The firm will specialize in evaluation, management proration, and unitization of oil and gas properties.

Mr. Yale
(See opposite column.)

Formation of **Resources Research, Inc.,** a firm of consultants specializing in solving air and stream pollution problems, has been announced by **Dr. Louis C. McCabe,** formerly scientist director in the U. S. Public Health Service. He will be joined in the new enterprise by **Frederick S. Mallette** of Riverside, Conn., executive secretary of the Committee on Air Pollution Controls and research manager, American Society of Mechanical Engineers, and **William S. McCabe,** consulting geologist of Casper, Wyo. The main office of the firm will be in the Wisconsin Building, 4435 Wisconsin Ave., N.W., Washington 16, D. C. . . . A new firm, to be known as **Seaman Engineering and Research Corporation,** has been established by **Harry J. Seaman,** Milwaukee industrialist. The firm has been established, according to Mr. Seaman's announcement, to pursue the study of soil stabilization and related mechanization. The design and development of new types of road building equipment is to be its main operation.

Operational Expansion . . . **Geophoto Services** of Denver, Colo., has expanded its operations to include a **Soils and Engineering Geology Section.** The new Geophoto section will be headed by **James G. Johnstone,** formerly assistant professor of engineering geology and highway engineering at Purdue University. Its work will be concerned with applications of air photo interpretation in soils and engineering studies. . . . **Joy Manufacturing Company** of Pittsburgh, Pa., has launched a new research and testing facility at Buffalo, N. Y., to be known as its **Turbo-Dynamics Division.** The ultimate purpose is the production of advanced compressors, turbines, and other air and gas-handling devices. **L. Roy Krouse** is head of the new laboratory, while **John D. Russell,** Joy engineering vice president, provides top management direction. . . . The **Lummus Company** of New York City, designing engineers and constructors for the petroleum and chemical industries, is establishing a new Engineering Development Center in Newark, N. J., according to **J. F. Thornton,** president. . . . Plans for construction of a series of research laboratories on a 22-acre site at **Stanford University,** for advanced scientific studies in the realm of missiles and unmanned aircraft, has been disclosed in a joint announcement by **Lockheed Aircraft Corporation** and the University. Lockheed is also planning a vastly expanded program for its Missile Systems Division by establishing a new base at Sunnyvale, Calif., according to **Robert E. Gross,** president.

Mr. Johnstone

Meeting

(Continued from page 36)

be acceptable by all boards of engineering registration for registration by endorsement."

The same subject was discussed by the Uniform Laws and Procedures Committee at their annual meeting in Washington which followed the Memphis meeting. Recommendation No. 4, approved by that convention, states:

"That a study be made which will eventually result in all Member Boards recognizing a certificate from the National Bureau as sufficient evidence of the qualifications of an engineer for registration by endorsement in their state."

It is recognized that the National Bureau of Engineering Registration, which has been investigating and certifying the record of registered professional engineers for many years, is the logical body to adopt means to provide some semblance of national registration. This Bureau has appointed a committee to study the changes necessary in its procedures so that its certificate of qualifications of an engineer will be accepted without question by all registration boards. If this move is successful, registration by endorsement will be very much simplified and a semblance of national registration will exist.

Before this becomes a reality there are many problems to be solved. It would be interesting to know how many of the 190,000 registered engineers have the qualifications and were registered under provisions which would be acceptable by the boards of all 52 states and territories holding membership in the National Council. Perhaps a very low percentage. This is due to the low requirements for registration in many states. An engineer may be qualified and competent but registered in a state which does not require a written examination. Many states will not grant him registration until he takes their written examination. The National Bureau may not be able to certify him without an examination.

Perhaps the first method of attack is back on the home front. Perhaps your state is one of the 17 where no examination is required of graduates of a recognized school. If so, your registrants will not be successful in obtaining a license in many states. NCSBEE has approved a set of SUGGESTED STANDARDS to guide their Member Boards in amending their law. These standards are set up as a goal to reach. Many state boards have a long way to go, but all are interested in improving their law.

To obtain amendments to a registration law it requires considerable study, work and time. The state registration boards are handicapped by their limited membership. It takes more than five men to sponsor a bill and obtain its passage through any legislature. They need the help of the state society. They need and will welcome your help.

Much work needs to be done by everyone who is interested in a larger and stronger engineering profession. To make it stronger the requirements for registration must be improved. The goal to aim at is for every state to increase its requirements up to the level of the SUGGESTED STANDARDS. Many legislatures are now in session. This is the time to begin planning for needed amendments.

Board Action: Report received.

RESOLUTIONS

Resolution 2-56

(Submitted by ECPD-NSPE Relations Committee)

WHEREAS, a committee of ECPD and one of NSPE have been working together effectively for several years on problems of concern to the engineering profession; and

WHEREAS, the committee of ECPD made a recommendation to the council of ECPD that an invitation to be extended to NSPE to become a participation body of that organization; and

WHEREAS, such recommendation was approved by the ECPD Council at its meeting October 28, 1954, and submitted to the member societies; and

WHEREAS, the recommendation not having been approved by the required number of constituent societies at the time of the ECPD meeting October 13 and 14, 1955, and there being some doubt as to whether such approval may not be contingent on a request from NSPE for participation in the ECPD organization.

NOW, THEREFORE, BE IT RESOLVED, that in the interest of more effectively perpetuating the close cooperation which now prevails between the committees of ECPD and the National Society of Professional Engineers and its State Societies, NSPE request full and equal participation as a constituent member of the ECPD organization.

Board Action: Report Approved.

YOUNG ENGINEERS

The last report of your Young Engineers Committee stated the weaknesses of our present young engineers program as follows:

1. Need for a more effective program of recruiting young engineer members and Junior Engineers.
2. Need to encourage full participation of young engineer members in Society activities.

In that report four months ago it was also stated that your committee was giving consideration to organizing the young engineers in our Society so that they would have some very definite responsibilities for building up their own group, within the framework of NSPE. It is generally agreed that our modern young people can do an outstanding job at those things which they feel they are doing for themselves. Not only do they like to be on the team, but they like to have a chance to carry the ball. Your Young Engineers Committee has worked out a plan based on this thinking. . . .

The detailed plan which your Young Engineers Committee is pleased to place before you, and which we ask you to consider and approve as the policy of the Society, is as follows:

1. Each local chapter of the Society will be encouraged to place at least one young engineer (Junior Engineer or Professional Engineering member under 30) on each committee of the chapter where practical. Chapters will also be encouraged to include some younger Professional Engineers among those nominated for officers and directors of the chapter.
2. Each local chapter of the Society will be encouraged to reorganize its Young Engineers Committee at an appropriate time, appointing to this committee Junior Engineers and younger Professional Engineer members. It may be desirable to set an age limit at 30 or higher to fit the needs of the particular chapter. In chapters where it is desired, all of the young engineers under the age limit set may be appointed to the Young Engineers Committee.
3. The president of the local chapter will appoint a chairman of the Young Engineers Committee from the young engineers group and will also appoint one older member of the chapter as Young Engineers Committee Coordinator. The coordinator will attend committee meetings and coordinate their work with the chapter. The Young Engineers Committee may elect from their own group a vice-chairman and a secretary, and may appoint special sub-committees and their chairmen.
4. The Young Engineers Committee will be responsible for the following:
   - A. Determine the need for educational courses which the Junior Engineers and young Professional Engineers desire and make arrangements for these courses. Such courses may be exclusively for Society members or for larger groups of young engineers and E.I.T.'s outside the Society.
   - B. Plan and arrange for professional training programs and foster professional concepts in young engineers.
   - C. Determine the need for and arrange training programs in other fields, such as industrial management, supervisory training, employee relations, labor laws, and other appropriate subjects.
   - D. Plan and carry on NSPE membership promotion among E.I.T.'s and young engineers, coordinating this work with appropriate local chapter committees.
   - E. Plan and put on a program at a regular meeting of the local chapter to be known as Young Engineers Night. Plan and put on such other programs for the chapter as may be agreed upon.
   - F. Undertake special studies of problems facing young engineers and recommend to appropriate committees of the chapter those policies and actions which will reflect the attitude of young engineers.
   - G. Undertake other activities and programs which are of special interest to the young engineers as approved by the chapter.
5. Each local chapter will be encouraged to promote social activities that will be attractive to the young engineers and their wives and friends. The chapter, with the Young Engineers Committee, should determine whether these social activities should be exclusively for the young engineers or whether the entire chapter membership should be invited to attend. Some chapters may prefer to try each of these plans of social participation.
6. The chapters may allocate to the Young Engineers Committee any funds which they feel are appropriate and which can be made available for carrying on the work of the committee.

Board Action: Report approved.

Dues Refund

It was determined by the Board that the dues refund will be effective for 1955 and will be refunded by July 1, 1956.

...NEW LITERATURE...

To help the offering firms determine which literature you require, when requesting an item, be sure to list all specifications shown . . . and say you saw it in the AMERICAN ENGINEER.

SAVES DRAFTING TIME — A new booklet called "11 Ways to Save Drafting Time" is now available without charge to engineers and draftsmen. Published by Frederick Post Company, it's the first booklet that compiles the many ways of using intermediates to make quick modifications of drawing without changing the original. The booklet discusses 11 specific ways to use intermediates, with each of the time-saving techniques clearly illustrated. Brief copy takes the reader through every step of the process. Among topics covered are scissor editing, masking, the block-out method, successive additions and pre-printing. Copies available on request from the Reader Service Division of the Frederick Post Company, 3666 North Avondale Ave., Chicago, 18, Illinois.

—AE—

FIRE PROTECTION — "Automatic" Sprinkler Corporation of America, Youngstown, Ohio announces publication of a new highly illustrative Catalog 73, covering the various generally accepted methods of fire detection, fire prevention, fire control and fire extinguishment associated with the field of Special Hazard fire protection. Request from above concern.

—AE—

ULTRASONICS — A new and comprehensive 8-page bulletin covering application of the ultrasonic Reflectoscope for nondestructive testing of products and equipment, has been published by Sperry Products, Inc. The bulletin pictorially illustrates the many uses of the ultrasonic Reflectoscope and explains in simplified terms the principle of ultrasonic inspection as well as illustrating the latest types of equipment available. Copies of the bulletin, No. 50-105, are available upon request to Sperry Products, Inc., Danbury, Conn.

—AE—

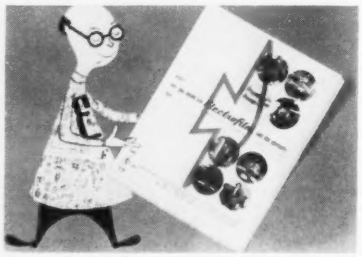
CATALOG — A complete reference guide to domestic and imported drawing instruments and drafting supplies has been released by Compass. This new 1955 catalog contains 64 illustrated pages, showing the latest in engineers', architects' and artists' supplies. Copies are available at no cost from Compass Instrument & Optical Company, Inc., 104 East 25th Street, New York 10, New York.

—AE—

AIRTUBES — Lamson Corporation announces the release of a new catalogue, "Airtube On Target." It is a fifty page, multi-colored, hard covered book describing the several sizes of Airtube systems, central desk and the semi and automatic switch systems as well as the variety of carriers that are available. An entire section is devoted to describing in detail the variety of carriers that are offered along with outline diagrams of each type of carrier so that you can determine the size of the carrier that is needed. Copies of this new book may be obtained by writing Lamson Corporation, Syracuse 1, New York.

STEEL — A new booklet on Lukens "T-1" steel, described as a high-strength, readily welded, weight-saving alloy steel, has been announced by Lukens Steel Co. The bulletin uses charts, graphs, sketches and photographic illustrations in describing this new engineering material, which is available in thicknesses from 3/16" to 6" and above and in standard widths up to and including 195", with a maximum length of 720". Request from Lukens Steel Co., Coatesville, Pa.

—AE—



LUBRICATION — A completely new brochure showing the latest technical advances of Electrofilm's (patented process) Solid Film Lubrication is now available. Electrofilm, Inc., of North Hollywood, California, has incorporated in this literature results of recent laboratory and research efforts. Solid Film Lubrication is said to inhibit fretting corrosion, prevent galling and seizing, lubricate under high loads, high speeds, high and low temperatures from —100°F to +700°F (in some applications to 1100°F), and always produce dry, clean and dust free operation. A copy of the new B-3 Brochure is available on request.

—AE—

CLAY CONDUIT — Heat Transmission Conduit Company, announces their new Bulletin #56 is available. The 20 page Bulletin describes various types of clay conduit structures for underground steam, hot water and process piping, and is fully graphic of their application to varying job installations. Copies may be obtained by writing direct to Heat Transmission Conduit Co., 2300 Payne Avenue, Cleveland 14, Ohio.

—AE—

MINIATURIZATION — A unique approach to miniaturization is offered in a booklet on the subject published by the Standard Pressed Steel Co. Pointing out the paradox of miniaturization—it means more not less—the handsome 20-page booklet describes an approach to the problem that may well serve as a guide to the application of miniaturization to the over-all fields of industrial and consumer-product design.

Illustrated with charts and photographs, the booklet shows the importance of precise laboratory information on physical strength and probable loads as a prerequisite to using the smallest possible part. Copies of the booklet, "Miniaturization" can be obtained by writing on a company letterhead, giving position or title, to A. W. Scott, Advertising Manager, Standard Pressed Steel Co., Box 168, Jenkintown, Pa.

WASTE TREATMENT—A new and highly informative technical article T-136 on plating waste treatment is now available from Graver Water Conditioning Co. "Plating Waste Solutions — Recovery or Disposal," discusses the two possible methods of treating plating wastes by ion exchange or precipitation. The former results in recovery of valuable materials from rinse solutions, while the latter amounts to destruction of the materials. Includes costs involved, space requirements and other important data required for a sound choice between methods. There are two useful monographs on estimating chemical recovery and the value of the recovered water. Other illustrations show typical plants and details of equipment. Copies are available without obligation from Graver Water Conditioning Co., 216 W. 14th Street, New York 11, N. Y.

—AE—

FACTS ABOUT HYPALON—No. 3, Elastomers Division, E. I. du Pont de Nemours & Co., Wilmington 98, Delaware, a new publication for operating and design engineers. Describes one of the chief properties of HYPALON synthetic rubber, its ozone resistance. Specimens have been exposed to concentrations up to four percent for several years; no ozone crack has ever been observed. Describes several case histories, including that of the manufacturer of commercial-size ozone generators who has changed from plastic to HYPALON for head gaskets on his equipment.

—AE—

VOLTAGE-DIGITAL TRANSLATORS —A recently presented article on high-speed voltage-to-digital translators by Bernard M. Gordon, President of Epsco, Incorporated, outlines theory and applications of these versatile units. Theoretical considerations and field experience have played important roles in the recent developments in the field of voltage-to-digital data conversion systems. This article gives considerable insight into the application of these new devices in the fields of data reduction and offers a theoretical discussion of the requirements of systems used in data reduction. Copies of this technical article are available from: EPSCO, Inc., 588 Commonwealth Ave., Boston, Mass.

—AE—

RACEWAYS — Complete information on heavy-wall and thin-wall steel raceways is offered in a new 20-page booklet just announced by General Electric's Conduit Products Department. This booklet covers galvanized and black enameled rigid steel conduit, electrical metallic tubing, and plastic-coated steel conduits. In addition to complete descriptions and specifications, the booklet contains a number of data tables on allowable conduit and EMT fill for various cable types. Considerable test data is also included. The booklet, publication No. 18-255, is available without charge from Construction Materials Division, General Electrmic Co., Bridgeport 2, Conn.

Brandt

(*Continued from page 45*)

And, of course, as we have discussed before, the Government does a lot of their technical reading for them and sees that it is channeled to the interested industries.

One thing that made an impression on me is that we saw a lot of machine tools being manufactured, and the number being produced seemed to be far out of line with the number we saw in use. These machine tools are going somewhere, and one strongly suspects that it is into military effort.

Q: **How do you feel about this exchange of Russian and American visits in which you have participated? Do you think it is a valuable program that should be expanded? Or do you have any reservations about it, in line, for instance, with some recent objections that we have been showing too much of our first-class industry to the visitors and that we should not be quite so helpful to them?**

A: I think that the exchange of Russian and American visits is worthwhile, and I say this even though I believe that there is a great deal more for them to learn from us than they could teach us. I say this, too, partly because we are operating more in the dark about what they are doing than they are about what we are doing at the present time. I think we have been somewhat overly complacent about our ability to outproduce them in every line. Through these visits, the Russians may learn some things from us a little more quickly than they would otherwise, but in turn we will learn some things that we would *never* learn otherwise.

Q: **What particular advice then would you give to the American engineering profession in the light of your Russian observations?**

A: Well, my first piece of advice is that more American engineers should learn Russian. Then I believe we should not remain complacent about our ability to do a better job than the Russians; we must avoid any such "Maginot Line" philosophy. I think that right now we are doing a better job, but the gap is narrowing perceptibly. We are, I am sure, twenty-five years and even more ahead as far as general standards of living go, but the question of military production is another matter. Their military production is, of course, on a planned basis, so that they would not have to bother to convert in the event of a major war catastrophe.

I think that the greatest strength that the American engineering profession has, as compared to the Russian, is that we have people here who are broader—broader in the sense of knowing more about various fields of engineering and also in the sense that they have better judgment and knowledge outside the strictly technical field. We should not try to emulate the over-specialization of the Russians. But the thing that we should learn from them, and in which we should have the help of all engineers, is to rebuild the status and prestige of our educational system.

Taking an over-all look, I would say that for the two economies to match each other in output, the Russians would need far more engineers than we would. Our economic system is the thing that will save us. We are so much more flexible here. The Russians, because of their strictly controlled system, simply can never be as fast on their feet with consumer goods as we can where the economy is flexible and an individual or a company can see a need and go into production to fill it. We need to develop more faith in ourselves, the superiority of our system, and our own abilities—without at the same time, as I have said, being overly complacent.—***End.***

Advertisers' Index

Adache & Case, Engineers 42
Albright & Friel, Inc. 42
Ammann & Whitney 41
Audio Visual Research 4
Michael Baker, Jr., Inc. 42
Elmer S. Barrett Associates 42
E. D. Barstow & Associates 42
Paul Berg 40
Bettenburg, Townsend & Stolte 41
Black & Veatch 41
George W. Brandt, Engineer 42
Brown & Blauvelt 41
Bustin Steel Products 8
Burns & McDonnell 41
Capitol Engineering Corporation 42
Commonwealth Associates, Inc. 40
Consoer, Townsend and Associates ... 40
Conwell Lucas 40
Crescent Engineering Company, Inc. .. 40
Geo. E. Deatherage & Son 45
DeLeuw, Cather & Company 40
Drake & Townsend, Inc. 41
Ellmann Engineering Co., Inc. 44
Engineers Testing Laboratory, Inc. ... 43
Eustis Engineering Company 40
Eugene K. Falls 40
Fay, Spofford & Thorndike 40
Orrin E. Fenn 40
Point Consulting Co. 44
Ferguson-Gates Engineering Company 44
Forrest and Cotton 44
Foster & Cafarelli 42
Fraser, Weir & Assoc. 40
Frazier-Simplex, Inc. 43
Freese & Nichols 44
Gannett, Fleming, Corddry & Carpenter, Inc. 43
Giles Drilling Corp. 44
Gustave M. Goldsmith 42
Green Engineering Co. 43
Hall Laboratories, Inc. 43
Hardesty & Hanover 42
Frank E. Harley & Associates 41
Frederick R. Harris, Inc. 42
The Hinchman Corporation 41
Howard, Needles, Tammen & Bergendoff 42
Harris Henry Lantz & Potter 43
Philip J. Healey, Inc. 44
Hopf & Bertalott 43
Industrial Ovens, Inc. 42
J. Z. Jizba 41
Kaiser Engineers 40
Kennedy-Riegger Drilling Co., Inc. .. 44
Kirk & Cowin 40
A. C. Kirkwood & Associates 41
Kuljian Corporation 43
Law-Barrow-Agee Laboratories, Inc. .. 40
Lawrie & Green & Associates 43
Lockwood & Andrews 44
Louis J. Lucas 40
Madigan-Hyland 42
Manu-Mine Research & Development Co. 44
Emmet J. McDonald 42
Frank D. McEnteer 44
Metcalf & Eddy 40
Merritt & Welker 40
Modjeski and Masters 43
George V. R. Mulligan, P.E. 40
H. C. Nutting Co. 42
James P. O'Donnell 42
Oklahoma Testing Laboratories 42
John Ostborg 42
Palmer & Baker, Inc. 40
Parsons, Brinckerhoff, Hall & MacDonald 42
Plumb, Tuckett & Pikarsky 40
Praeger-Kavanagh 42
Revolvator Company 6
Cyrus Wm. Rice & Co., Inc. 43
Robert and Company Associates 40
Russell & Axon 41
Sacramento State College 45
Sellye, Stevenson, Value & Knecht 42
Singstad & Baillie 42
South Florida Test Service 40
D. B. Steinman 42
Stromberg-Carlson Co. 5
Sverdrup & Parcel, Inc. 40
Syska & Hennessey, Inc. 42
Tippets-Abbett-McCarthy-Stratton 42
Toledo Testing Laboratory 42
Turner Balances and Weights 44
United States Testing Company, Inc. .. 41
Emerson Venable 43
Water-Tight Underground Conduit .. 44
Paul Weir Co. 40
Whitman, Requardt and Associates .. 40
A. W. Williams Inspection Co. 40
Wilson & Company 40
Wisconsin State Highway Comm. 45
The Wright Engineers 44

What's New

AMERICAN ENGINEER March, 1956
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 1 to:

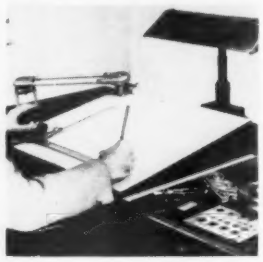
Name ..... (Title)

Company .....

Street .....

City and Zone ..... State .....

PERSONAL DRAFTING SYSTEM — Item 1



Universal's new executive DESK-TOPPER features a personal size professional drafting machine, complete with folding drawing board, accurate metal scales, instrument box and carrying carton or custom-built travel case. You create your own drafting room wherever you are, in your home, office, hotel room, on plane, train or in the field. There is no need for an extra drawing table or lamp. Desk-Topper operates easily on your own desk or standard table. All items store compactly in an average desk drawer or cabinet.

AMERICAN ENGINEER March, 1956
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 2 to:

Name ..... (Title)

Company .....

Street .....

City and Zone ..... State .....

COLOR DRAFTING PENCIL — Item 2

Mars-Lumochrom, answers a long-standing need for a colored pencil with all the fine drafting characteristics of high-quality black graphite drawing pencils. Color drawings made with Mars-Lumochrom are waterproof, erase perfectly and do not smear or fade. The leads hold a fine point without frequent sharpening, producing long, even lines. Since all 24 colors have the same degree of transparency under carbon-arc and mercury-vapor lamps, good blueprints result. Each pencil will draw two miles of lines.

AMERICAN ENGINEER March, 1956
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 3 to:

Name ..... (Title)

Company .....

Street .....

City and Zone ..... State .....

PLASTIC CLAY PIPE JOINT — Item 3

New Plastic Jiffy Joint Clay Pipe by Cannelton Sewer Pipe Co. has a bright red polyester plastic spigot collar. The new joint eliminates the problem of "squashed out" spigot end joints and permits faster installation. Installation of sewer pipe for house and building connections is reduced to two simple steps. Only the bituminous socket is painted with solvent—not the red plastic spigot. The sections are then pushed together with a slight spiral motion.

AMERICAN ENGINEER March, 1956
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 4 to:

Name ..... (Title)

Company .....

Street .....

City and Zone ..... State .....

CAULKING TAPE — Item 4

Warflex Caulking Tape is a pressure-sensitive, "flexible" sealer. It has exceptional adhesive characteristics and will adhere positively to clean surfaces such as aluminum, steel, porcelain, wood, glass, etc. Non-oxidizing, non-film forming, flexible. Will compensate for expansion and contraction normally encountered in building applications. Will maintain a positive seal under all weathering conditions through an ambient temperature range of —65°F. to 150°F. Contains 100% solids. No volatile solvents. Composition consists of an elastomer vehicle aluminum powders, asbestos fibers and inert pigments.

AMERICAN ENGINEER March, 1956
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 5 to:

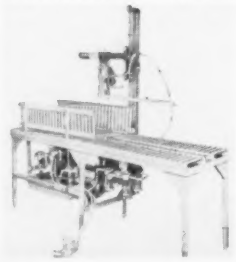
Name ..... (Title)

Company .....

Street .....

City and Zone ..... State .....

CONTAINER STAPLING — Item 5



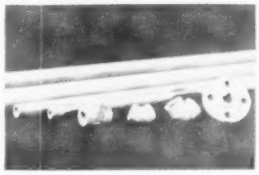
This machine staples tops and bottoms, *simultaneously*, of center slotted corrugated and fibre board boxes after they have been packed. Equipped with two stapling heads, air operated with fully pneumatic controls, Model CSC-2 has *No Electrical Connections*, i.e., no relays, no solenoids, no microswitches, no electrical wiring, and no fuses. The air valves are operated by *Completely Mechanical Means*. Designed by Werner Schafroth and manufactured exclusively by Container Stapling Corporation.

This column describes new products of general interest to professional engineers. For further information, fill in the coupon provided and mail to the AMERICAN ENGINEER.

These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.

UNPLASTICIZED PIPE — Item 6

A new material of construction for use in engineering design and replacement, EASTON rigid unplasticized polyvinyl chloride pipe with such inherent properties as extreme corrosion resistance, dimensional stability, low fabrication and maintenance cost, light weight and high tensil strength. Excellent application in low pressure fields. Standardized I.P.S. sizes available through Easton Plastic Products Co., Inc.



AMERICAN ENGINEER March, 1956
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 6 to:

Name ..... (Title)
Company .....
Street .....
City and Zone ..... State .....

CORROSION PREVENTIVE PAINT — Item 7

Corro-Vent is a new thermoplastic, resin base paint that contains what is said to be the most efficient inhibitor known to prevent rust and corrosion. Ideal for use on structural metals, in refineries, utilities, etc. Easily applied by brush, spray, dip or flow-coat process. Quick dries to a tough, hard durable high gloss adherent film. Can also be dried by baking. Resistant to acids, alkali, alcohol, salt, grease, vegetable and mineral oil, etc. Cannot mildew, oxidize, or saponify, is non-skimming and can be stored indefinitely. Flexible and resilient and can be bent back and forth, crumpled, rolled or abused without breaking, chipping, cracking or peeling. Excellent for protecting tarps against mildew.

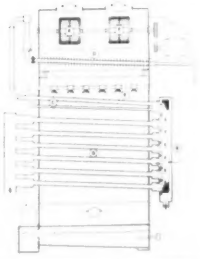
AMERICAN ENGINEER March, 1956
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 7 to:

Name ..... (Title)
Company .....
Street .....
City and Zone ..... State .....

VAPOR CONDENSER — Item 8

Niagara Blower Co. announces a Vapor Condenser in which cooling is done by evaporation of moisture on the surface of tubes through which the vapors pass. Installed on the top of a stripping column or above a vacuum kettle, the apparatus forms a complete, self-contained condensing system. Heat is rejected from the coil surface directly to the outdoor air in a fan-induced air stream. Water sprayed over the coils is recirculated and the only water service required is for a small make-up.



AMERICAN ENGINEER March, 1956
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 8 to:

Name ..... (Title)
Company .....
Street .....
City and Zone ..... State .....

JOINT SEALER FOR PAVINGS — Item 9

A new compound developed by the Manu-Mine Research & Development Co. of Reading, Pa., may go a long way toward helping to preserve and strengthen the Nation's highways and streets. The compound is Manu-Tite, used primarily to seal the joints of highways and airport runways, particularly the joints of runways used by jet aircraft. It is a cold-applied substance, designed to withstand the heat of exhausts of big trucks on highways and of jet aircraft on airport runways. Manu-Tite will not be dissolved by gasoline, oil or jet fuels.

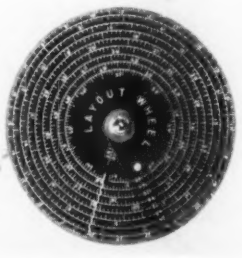
AMERICAN ENGINEER March, 1956
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 9 to:

Name ..... (Title)
Company .....
Street .....
City and Zone ..... State .....

INDEX LAYOUT WHEEL — Item 10

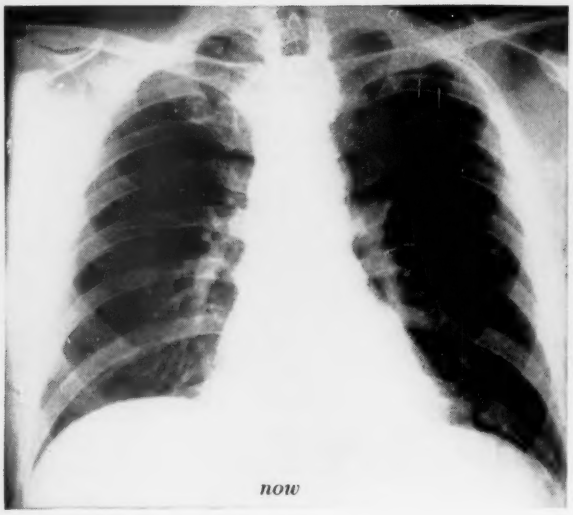
This layout wheel provides both a measuring wheel and a conversion chart on the face of the wheel for quickly converting from diameter to circumference or the reverse. The wheel is calibrated in inches around its circumference. Also contains a number of concentric circles which are graduate in diameter figures. Provides a means for quick calculation and layout of tubular constructions.



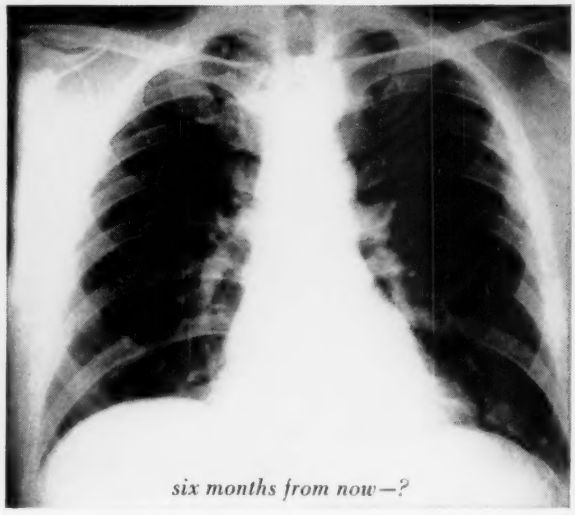
AMERICAN ENGINEER March, 1956
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 10 to:

Name ..... (Title)
Company .....
Street .....
City and Zone ..... State .....



now



six months from now—?

TWICE A YEAR

MEN OVER 45!...Lung cancer, in men of your age, has increased so alarmingly in recent years that our doctors strongly recommend that you make a habit of having *two* chest x-rays every year: one, when you get your annual medical checkup; the other six months later.

Today, you are six times more likely to develop lung cancer than a man of your age twenty years ago. Our doctors still don't know *why* you are, but they *do* know that their chances of saving your life could be as much as ten times greater if they could only detect lung cancer "before it talks"...before you notice any symptoms whatsoever in yourself.

That's why we urge you and every man over forty-five to make semiannual chest x-rays a habit —for *life*.

To see our lifesaving film, "The Warning Shadow," call the American Cancer Society office nearest you or simply write to "Cancer" in care of your local Post Office.

American Cancer Society